

IMPORTANT DATES FOR WINTER QUARTER

Jan 2	Symposium app Opens
Jan 3	First Day of Instruction
Jan 9	Last day to drop a class without a fee thru MyUW
Jan 10	All Courses Require Entry Codes to Add
Jan 13	Last Day to Apply to Biology major in Winter
Jan 16	Last Day to drop a class without the use of the CURRENT QTR DROP
Jan 16	Martin L King Jr Holiday
Jan 20	Spr Time Schedule online
Jan 22	Last Day to Add a Class through MyUW
Feb 8	Last Day to Apply for Grad Reg Priority (GSP) for Spring
Feb 12	Undergrad Research Symposium App deadline
Feb 10-26	Spring Reg Priority 1
Feb 20	Presidents' Day Holiday
Feb 27-Mar 26	Spring Reg Period 2
Mar 10	Last Day to Withdraw (from all Win Qtr classes) or use current qtr drop
Mar 17	Last Day to convert to S/NS
Mar 13-17	Final Examination Week
Mar 20-24	Spring Break
Mar 22	Grades posted on transcript
Mar 27	Spring Quarter Starts

A Message from the Chair of the Undergraduate Program



Jennifer Ruesink, Chair of UPC

Dear Biology Majors,

I'm pleased to have this annual opportunity to welcome you to your winter-quarter classes and to reflect on the goals of the undergraduate major.

So take a moment with me now to look beyond the decision – and sometimes frustration – of next term's registration and see the big picture embodied in major requirements.

We can see five categories: 1) supporting and introductory coursework, 2) genetics, 3) natural history and biodiversity, 4) breadth, and 5) depth in upper-level electives, including two labs.

This framework means that everyone learns the fundamental processes by which information encoded in DNA is expressed and transmitted in living organisms (genetics), as well as the outcome in the amazing diversity found in clades (biodiversity) or ecosystems (natural history). The lists of elective options are lengthy, so that each of you graduates having wrestled intellectually with distinct biological content. It may surprise you to realize that the elective options are deliberate – like creating your own meal at a cafeteria or your own bouquet from a field of wildflowers. At a curriculum level, you can choose content, while we are much more interested that you emerge with skills – for academics, careers, and community participation.



So let's talk about those skills!

The National Association of Colleges and Employers (NACE) just released their new survey of what employers seek in resumes of successful job candidates. The top five items were identified as very or extremely important to at least half of 246 employers surveyed. And guess what? It's no longer your GPA, or anything particular about your transcript. Here's what employers identified:

- Critical thinking/ problem solving
- Professionalism and work ethic
- Quantitative and analytical skills
- Teamwork and collaboration
- Written (especially!) communication skills
- And rising fast is intercultural and global fluency.

Every time you meet a deadline and expectations, you demonstrate your professionalism and work ethic. The next time your instructor requires a group project, use it as an opportunity to add detail to your resume about how you managed group work transparently and equitably. Don't balk at equations, and maybe even look into Data Science or Quantitative Science minors, that hone your logic and numeracy. Practice writing, and seek feedback, because everyone can improve with practice!

Getting through college is certainly not just about preparing to be noticed by a potential employer. The message from the NACE survey is that employers are now seeking the academic skills inherent to the 21st Century, where information is everywhere, people bring different perspectives, and we have to navigate that complexity to make a difference for good. I encourage you to embrace those opportunities!

Best wishes, Jennifer Ruesink, Professor and Chair of the Undergraduate Program, Biology

BURKE MUSEUM CURATORS Who are at the same time Department of Biology Faculty

FREE admission to the Burke Museum of Natural History and Culture for University of Washington staff, students, faculty, and retirees with your Husky Card.

Hours: Tuesday - Sunday 10 am to 5 pm (Closed Monday)

The Burke Museum reopened in its new building on October 12, 2019. The new building features large windows into the research areas to showcase parts of the collection that were not previously exhibited. In the Kiara Milcoff article, the photo with her dissecting the Komodo dragon, if you look closely to the right you will see blurry faces and hands at the window that lets visitors see what is happening in the specimen prep room.

Each of the following galleries focuses on a particular category of Washington State natural history and culture: “Culture of Living,” “Northwest Native Art,” “Amazing Life,” “our Material World,” “Fossils Uncovered” (that includes one of the best preserved *T. rex* skulls in the world as well as numerous other fossils).

The museum houses more than 16 million artifacts and specimens in its anthropology, biology, and geology research divisions. According to the museum, its ornithology division includes the largest collection of spread bird wings in the world, while the museum’s collection of frozen bird tissues is one of the world’s largest. The Mammalogy Collection, which is managed by University of Washington professor and Burke Museum curator Sharlene Santana, contains more than 55,000 mammal specimens, and is regarded as the 10th largest collection of mammals in a North American university. The museum states that its collection of Northwest Coast ethnographic material is the fifth largest collection of Native American art in the world, numbering 10,000 objects. The gardens around the museum are planted with 50 species of Washington native plants. The independently owned and operated cafe is dedicated to native foods.

The Department of Biology and the Burke Museum are in a unique situation as they have shared faculty/curators. There are other departments on campus who do the same, but we seem to have quite a few of them that oversee large collections.

On the following pages, we have asked 6 of them, ‘what do curators do?’ Hoping to give you a sense of how their jobs are different as a curator of the Burke while also being a faculty member of Department of Biology.



Tyrannosaurus rex skull at the Burke.

And perhaps those looking for more experience or just want to learn more, there are volunteering opportunities at the Burke. Check out what our Curator / Faculty recommend on how to go about volunteering for the collections.



MISSION • DECOLONIZATION • LAND ACKNOWLEDGEMENT

The Burke Museum’s mission cares for and shares natural and cultural collections so all people can learn, be inspired, generate knowledge, feel joy, and heal.

Diversity, equity, and inclusion have the power to heal. These values are a way to help repair damage done to communities by a colonial model of museums that for decades privileged collections, preservation, and research over cultural autonomy and community survival.

The Burke has committed to decolonization as a key institutional priority, and across the museum we now work as facilitators and stewards, not as gatekeepers and designated authorities; we are learning to step back and allow the relationship between community and collections to be primary.

“We stand on the lands of the Coast Salish peoples, whose ancestors have resided here since Time Immemorial. Many Indigenous peoples thrive in this place—alive and strong.”

OUR BIOLOGY RESEARCHERS WHO ARE ALSO BURKE CURATORS What do they do?



SHARLENE SANTANA

Current Research

–Ecomorphology and macroevolution of mammalian feeding apparatus

–Multifunctional bat skulls

–Ecological and evolutionary interactions between bats and plants

Santana Lab website

<http://faculty.washington.edu/ssantana/wordpress/>

Teaching:

BIO 439 , BIO 448

What does your job entail as Curator?

As Mammal Curator, I get to oversee the growth, maintenance and use of the collection. This involves making decisions about what specimens we collect and preserve (and how) so they can be the most useful for future scientific research, outreach and education. My job as curator also overlaps with my job as Biology Professor in the areas of museum-based research and training of students. I also participate in the development of exhibits, education and outreach activities at the museum.

How does being Curator enhance your own research?

A large part of my research program focuses on studying how the anatomy of mammals has evolved and adapted to meet ecological demands. This directly involves using museum specimens to quantify anatomy, so having direct access to specimens facilitates my and my students' research. We also gain a lot of insight and ideas simply from exploring specimens in the collection, doing pilot comparisons, etc. Additionally, being able to decide on specimen preservation methods (e.g., preserving soft tissues, which is uncommon for some types of mammal specimens) opens up opportunities for our research that would be impossible otherwise.

What is your favorite part of curating at the Burke?

Natural history collections are a treasure trove of unexplored ideas. I love finding specimens that I hadn't seen before, being puzzled by something about their anatomy, and learning new things or starting new projects as a result. I also enjoy sharing this process with students in my classes; both my Mammalogy and Functional Morphology classes have labs that rely heavily on museum specimens. It's always a joy to see the students' faces when they are exposed to the diversity of mammals through specimens for the first time!

Do you have advice to give a student wanting to volunteer at the Burke?

Contact Curators or Collection Managers to ask about opportunities! We are constantly looking for volunteers who can assist in various tasks.

MAMMALOLOGY
THE STUDY OF MAMMALS



ALEJANDRO RICO-GUEVARA

Current Research

–3D Modelling Projects

–Floral Characteristic Impact on Hovering Energetics

–Multispectral Coloration at the Burke Museum

Rico-Guevara Lab Website

<http://ecophys.org/projects/>

Teaching:

BIO 354

What does your job entail as Curator?

As Curator of Ornithology I work with a team of wonderful Collection Managers to develop plans for not only preserving all of the different types of bird collections (for example round specimens, spread wings, tissues, eggs, skeletons, nests) but also doing research with which we connect to people of all ages!

How does being Curator enhance your own research?

Working with collections as Curator allows me to perform comparative morphological work, meaning that we could compare shapes, plumages, anatomies, etc. of birds from many different places simultaneously, without having to visit all of those places and capture all of those birds over and over for different studies. We study aspects such as the iridescence of hummingbird plumage using spectrophotometry in contrast with multispectral photography and create new tools such as macro-photogrammetry systems to study bird bills in 3D, which we can improve with museum specimens, but in the future, we could also apply this knowledge to studies with live birds.

What is your favorite part of curating at the Burke?

I love working with students and having the opportunity to share our research with the public. Several students are involved in our projects, and they truly revitalize the scientific process and have amazing ideas to improve what we do. Through the glass walls of the different workrooms where we operate, we have infographics and often take measurements, prepare specimens, create 3D models, and perform other museum research tasks which frequently engage visitors. Is a real joy to spread the joy of doing science with as many people as possible!

Do you have advice to give a student wanting to volunteer at the Burke?

Take advantage of the wonderful resources that the Burke has to offer, and don't hesitate to reach out to the teams of different collections if you are interested in a particular research topic or group of organisms.

ORNITHOLOGY
THE STUDY OF BIRDS

OUR BIOLOGY RESEARCHERS WHO ARE ALSO BURKE CURATORS What do they do?



ADAM LEACHE

Current Research

- Species delimitation in North American lizards
- Epidermal gland evolution and the origins of structural and chemical signaling diversity

Leaché Lab Website

<http://faculty.washington.edu/leache/wordpress/>

Teaching: **BIO 354, BIO 449/553**

What does your job entail as Curator?

Being a Curator at the Burke add a whole new dimension to my job as a professor at UW. It adds public interactions, exhibits and education opportunities, and mentoring students who want to learn how to care for and manage biological collections.

How does being Curator enhance your own research?

Our research on the evolution of biological diversity leverages specimens and genetic resources in natural history museum collections. Our research at the Burke is visible to the public thanks to our new "inside-out" work environment that allows the public to see behind the scenes and observe our collections-based research in action.

What is your favorite part of curating at the Burke?

Working with students that are passionate about biodiversity is easily the highlight of working at the Burke. Mentoring enthusiastic new students as they learn how to conduct scientific research helps keep our work relevant and exciting for everyone.

Do you have advice to give a student wanting to volunteer at the Burke?

Explore what the Burke has to offer, find a research project that aligns with your interests, and be persistent.



West African Forest Gecko

Hemidactylus fasciatus

HERPETOLOGY

THE STUDY OF AMPHIBIANS AND REPTILES



CAROLINE STROMBERG

Current Research

- Evol. of Grasses & Assembly of Grassland Ecosystems.
- Biotic Responses to Climate Change in Deep Time
- Evolution and Functional role of Silica in Land Plants

Strömberg Lab Website

<http://www.stromberglab.org>

Teaching:

BIO 438, BIO 447, BIO 499/ESS499

What does your job entail as Curator?

My job as a curator of paleobotany entails caring for our collections of fossil plants (including fossilized leaves, wood, flowers, fruits, seeds, pollen etc.) in various ways. I help grow the collection through fieldwork for my lab's research but also through donations. I oversee the curation of these fossils, which means that they get prepared if needed (cleaned or extracted from the rock), they get assigned a number, and all the information about each fossil gets entered into a database. I also help make sure our plant fossils are made available to researchers to study and that the public are educated about them through our website or through public outreach events. I particularly enjoy creating exhibits about our fossils and showing them off at family days in the Burke Museum (e.g., Dino Fest).

How does being Curator enhance your own research?

Much of my research involves collecting new fossils, so curating collections is a natural extension of it. Our big collection of fossils from around the Pacific Northwest and beyond provides numerous opportunities for students to discover new projects right there in our drawers without having to travel far. It is like a treasure chest of questions waiting to be explored and answers to be discovered! Having access to this is such an amazing advantage for developing cool projects. Also, when researchers visit to study our fossils there is always an exchange of ideas and perspectives. Similarly, making exhibits stretches my thinking because I often have to create content about topics that fall a bit outside my own research field. Both of these aspects enriches our research.

What is your favorite part of curating at the Burke?

I love almost all aspects of being a curator! For example, I really enjoy working together with Burke collections staff to improve our collections and access to our collections. And I love when students are inspired to do research in our collections. Right now, I'm excited about decolonizing our collections. I feel privileged to have the opportunity to take actions as a curator that might have an impact also on social justice.

Do you have advice to give a student wanting to volunteer at the Burke?

If they know which collection they want to work in, they can reach out to me or other folks in Research and Collections directly!

PALEOBOTANY

THE STUDY OF FOSSIL PLANTS



OUR BIOLOGY RESEARCHERS WHO ARE ALSO BURKE CURATORS Their Collection?



GREG WILSON MANTILLA

Current Research

- Mammalian change across the Cretaceous-Tertiary boundary
- Mammal tooth shape and diet
- Biogeography of Cretaceous mammals

Wilson Lab Website

<https://faculty.washington.edu/gpwilson/wordpress/>

Teaching:

BIO 438, BIO 443, BIO 475A/
ESS499 A, Bio 499

What does your job entail as Curator?

As a Curator of Vertebrate Paleontology, I'm tasked with stewarding the collections of vertebrate fossils that we already have at the Burke. That includes making sure that the information associated with the specimens is properly uploaded and maintained in databases accessible to the public and to researchers (this is done in conjunction with Collections Managers). We also seek to build or add to our vertebrate paleontology collections through active field research collecting programs. Much of that I do in the Hell Creek area of northeastern Montana. Lastly, we are tasked with helping the museum to promote the research that we do and the collections that have to the general public. This involves consulting on exhibits, offering programs to the public, and giving talks in house and off campus.

How does being Curator enhance your own research?

My research focuses on specimens and inferring ecology and evolution of groups in deep time. So being a Curator allows me to tap into the amazing resource of the Burke's vertebrate paleontology collections. Also, being a Curator gives me an opportunity and venue to promote science and paleontology more broadly to the public.

What is your favorite part of curating at the Burke?

I love getting to sit down and study specimens under a microscope. And in that process I get to learn something new about past life and ecosystems.

Do you have advice to give a student wanting to volunteer at the Burke?

Yes, spend time in the exhibits and see what objects and stories really grip you. Talk to people who work in those collections. Take classes from curators, get to know them. And simply express your fascination with the topic and your desire to learn more. Be prepared to start with the most basic of tasks and stick with it.

VERTEBRATE PALEONTOLOGY

THE STUDY OF ANCIENT ANIMALS THAT HAVE A VERTEBRAL COLUMN



DAVID GIBLIN

The Department is currently hiring a new Curator so we reached out to David Giblin, Herbarium Manager.

What does the Herbarium Curator do?

The Herbarium Curator is responsible for overseeing the operations and building of the Herbarium collections, advocates for the collections within the Museum and College of Arts and Sciences, supervises Herbarium staff, supports undergraduate research in the collections, and provides leadership with fundraising for the collections through grant writing and donor support. Collections made by the Herbarium Curator through their field work and that of their graduate students are deposited and permanently stored in the collections.

How do Herbarium specimens help research?

Specimens document the taxonomic diversity and distribution of species in geographical space and time. They are used for research in molecular (DNA-based) systematics, alpha taxonomy (description of new species based on morphology), rare plant conservation, invasive species biology, ethnobotany, pollination biology, climate change impacts, and the illustration of new species. Specimens are used by UW faculty, students, and staff, by visiting researchers, and by researchers worldwide who gain access to them either through online databases or specimen loans.

The Flora PNW, 2nd Edition was recently produced which we were told was an enormous undertaking. Can you please explain the process and how it ties into the plants you have in the collection?

The Flora PNW, 2nd edition is a technical identification manual to the 5,000+ wild-occurring, native and introduced species, subspecies, and varieties of vascular plants between southern British Columbia and southern Oregon, east to western Montana and the northern 2/3rds of Idaho. Identifications are made through the use of dichotomous keys written on the basis of the morphological characters of the specimens and the habitat and distribution information on each specimen label. We don't go out into the field and make notes on what we see - we go into the field to collect specimens so that we can store them permanently in the Herbarium and work on them there. This 2nd edition includes over 1,200 plants and illustrations not included in the 1st edition published in 1973.

Do you have advice to give a student wanting to volunteer at the Burke?

There is a long history of Biology students volunteering and conducting research in the Herbarium (located in the basement of Hitchcock Hall). Anyone who is interested should contact David Giblin (dgiblin@uw.edu) to set up a time to discuss what opportunities are available.

HERBARIUM
THE STUDY OF PLANTS



UW BURKE MUSEUM MAMMOLOGY Baird's beaked whale: from specimen to display

We asked Jeff Bradley, Collections Manager for Mammalogy at the Burke Museum to give us an example of taking a mammal specimen and making it into a display at the museum.

We will follow the journey of the 39' female Baird's beaked whale (*Beradius bairdii*) that is currently hanging in the main lobby of the Burke. The next time you visit the Burke you can look for her and know her special story.

This skeleton is now one of about 10 Baird's beaked whales in the US. museum collections and offers incredible insights into a species that is rarely seen or studied.

The species occurs in the North Pacific Ocean and the Japan, Okhotsk, and Bering seas. It is a deep-water species, primarily frequenting depths between 1000 m and 3,000 m. on a diet consisting largely of squid, pelagic and deep-sea fish. They prefer life in deep waters near the continental shelf and seamounts.

Males can reach lengths of about 11.9 m (39 ft) and females 12.8 m (42 ft). Their snout, called a beak, is elongated and lacks all teeth except for two pairs, only one of which erupts through the gums, in the front of the lower mandible. These are sometimes called battle teeth for their use in intra-species conflict, individuals often bear scars from such confrontations.



Baird's beaked whales live a long time, with males out living the females. It was thought they can live 84 years. They are really social animals and most commonly form tight-knit groups of between 5 and 20 whales. Swimming closely along together, they surface, breath and sometimes breach at the same time, creating a sort of synchronicity within the group.

In May 2015, the new Burke Museum existed only in architectural drawings. But those drawings including a vision for a large whale skeleton hanging in the main lobby of the new building. The planners came to Sharlene Santana, the Burke's Curator of Mammals, asking for whale specimens that would be good options for this, and were disappointed to learn that the Burke did not already have a display-quality whale skeleton. But two days later, the Burke received an email from the Marine Mammal Stranding Network with a notice of a stranding of a Baird's beaked whale on the Washington coast.

Jeff was out the next day to the beach to check it. The good part was the stranding was recent, and the entire skeleton was intact. The cause of death appeared to be an infection related to childbirth. This was only the 5th Baird's beaked whale known to have been found in Washington. They are rarely encountered as strandings because they typically live far from shore, even those that die usually sink before landing on a beach. It was like a miracle. They had their perfect whale for the Burke lobby.



May 2015: One day after the whale stranding.

Museums typically clean skeletons by placing them in a colony of Dermestid beetles, which clean all the soft tissues from the bones. Whales, too large to fit into a beetle colony, are often buried so the natural process of decay can remove most of the soft tissue, and then the bones are unburied before that natural process starts to weaken the bones. So they buried the whale on the beach.

The burial crew included a large excavator and about 30 volunteers from the UW, Cascadia Research Collective, and local Marine Mammal Stranding Networks. The excavator was needed to dig two large holes



May 2015: Three days after stranding, excavator used to maneuver the whale and dig the two large holes.



May 2015: Getting the bones ready for burial. Large crew removed skin, blubber and most flesh from the bones.



May 2015: Skeleton covered with plastic mesh before covering with 2 ft of sand.

(one for the soft tissue being discarded, and one trench to hold the skeleton) and to move the whale parts into them. The trench was about 5 feet deep and below the water table. Jeff put a mesh covering over the trench to keep any animals from digging up and taking any of the bones. There was at least a good two feet of sand capping the whale bones.

The crew removed all the skin and blubber, and most of the muscle, using large knives. The head was cut off separately and then the skeleton halved, so three major parts to put in the trench. A separate crew was assigned to locate and remove the pelvic bones, located in the belly far from any other bones. These bones are small (relatively), far from the spine or any other bones. These pelvic bones were once used, by ancestors of whales, to attach the lower limbs. As whales evolved to lose these limbs, the pelvic bones were retained but today are only used only as attachments for gonads during development.

Jeff waited one year and went back to check on how the normal process of decay was doing. He had used GPS to mark the burial trench but GPS is not that accurate nor did he know if the burial had another layer of sand on top of it, so depth was also a question. He was finally able to find the skeleton after digging a large number of 3' foot holes. He realized a least an additional foot of sand had been put over the burial area so deeper than before. The bones were not done yet and quite stinky. This time he did a better job of triangulating the location on the beach. It ended up taking about two years until that decay process was done and it was now time to dig her up.

For the unburial, Jeff put together another crew of about 30



June 2017: Two years after burial, another large crew (with help from the same excavator) dug the bones out of the sand.



June 2017: Bones initially scrubbed with sea water.



June 2017: Long day, scrubbed bones laid out .

volunteers from the UW and local stranding networks. The bones were unburied, with the help of the same excavator, and then scrubbed in the surf before being loaded into a box truck and brought back to the Burke.

— Continued next page

YouTube video of this whale: <https://www.youtube.com/watch?v=320veDbJQH0>



June 2017: Some of the unburial crew, with the skeleton ready to take back to Seattle.

Although mostly cleaned, the bones still smelled strongly of decay, and posed a challenge in terms of where to store the large pile of stinky bones.

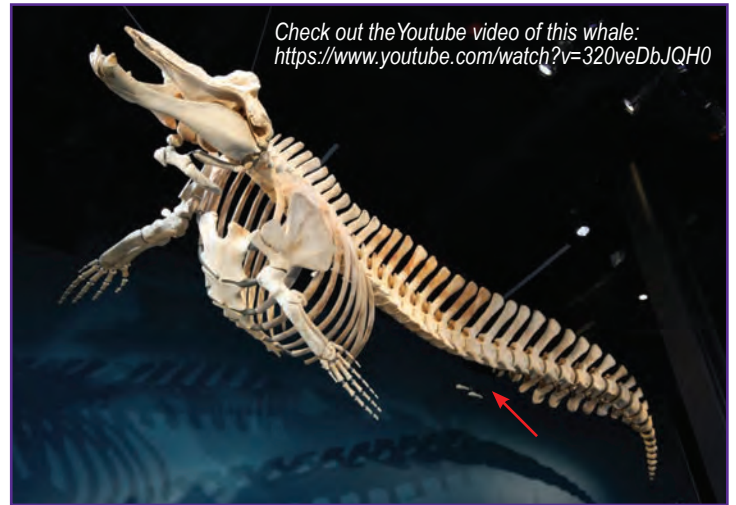


August 2017: Bones stored on the roof of the old Burke Museum, awaiting articulation.

It was decided to let them air out on the roof of the old museum, while the planners decided where to send the skeleton for articulation. They remained there on the roof for about a year, and during certain conditions with the right windows open, the scent of stinky whale bones could be smelled throughout the old Burke Museum.

Cetacea, a Canadian company that specializes on whale articulation, was chosen to clean and articulate this whale. Beaked whales, like all toothed whales, have special fats in their bones used to produce and receive sounds used in echolocation, these can be difficult to remove from the bone. Cetacea uses a unique vapor-cleaning method to render this oil from the bones, a step thought to be crucial for making sure that whale bones would not be smelled throughout the new Burke Museum.

When you look at the skeleton hanging above the grand stairway in the Burke's main lobby, it's hard to miss the pair of small bones suspended beneath the back end, attached to a delicate aluminum rod. These are the vestigial pelvic bones, successfully

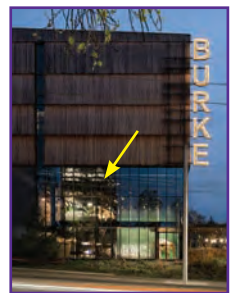


Check out the Youtube video of this whale: <https://www.youtube.com/watch?v=320veDbJQH0>

Completed skeleton hanging in the Burke's lobby. The 2 vestigial pelvic bones are pointed out by the red arrow.

found during the initial dissection and burial of the skeleton. These were brought back to be cleaned in the Burke's Dermestid beetle colony, rather than risk losing them in the sand with the rest of the bones. The hang down beneath the articulated skeleton, an in-your-face reminder of the evolutionary connection between whales and us and all mammals.

Baird's beaked whales are fast, powerful predators at enormous depths using bio sonar to catch animals who are trying really hard not to be caught. For the articulation, they wanted the posture of the whale to reflect that activity. And the pose she is hanging in the lobby, really gives you a sense of what she looked like swimming hard after food.



The skeleton can be seen from the west side of the Burke on 15th.

Thank you to the photographers: Aaron Barna, Tristan Levine, Dennis Wise and Jeff Bradley. Your photographs helped tell the story of the Baird's beaked whale in the lobby of the Burke.

UW BURKE MUSEUM MAMMALOGY What is the Dermestid Beetle Colony eating today?

Dermestes maculatus is the species of carrion beetle typically used by universities and museums to remove the flesh from bones in skeleton preparation. Human and animal skeletons are prepared using this method and the practice has been in use for over 150 years. The beetles are especially useful for small animals with delicate bones.



As in the case of the Baird's beaked whale, Jeff Bradley did not bury the more delicate vestigial pelvic bones at the beach, he brought them back to the Burke and had the beetle colony do its thing on those small bones.

The Burke's colony was killed off while they were in the process of moving all the collection over to the new New Burke. It was to insure no beetles hitched a ride over. If they got into the collections they could destroy them.

The colony they have now was built with a donation of beetles from one of their volunteers. The room where the Colony resides can only be entered from the outside. It was built this way to prevent any escaping beetles from entering the rest of the building and above all, protect the collections.

What are the beetles eating these days you ask?

A bear named Denali died recently at the Woodland Park Zoo and is being prepped to go in to feed the colony. There was the skull and paws in the specimen prep room when we were there.

It can take a colony anywhere from a few days to weeks to clean off a skeleton depending on its size. When the skeleton is done, they try and shake off the beetles and larvae as much as possible. As a second precaution, they bag and freeze each specimen to kill off any possible stowaways. Then pick out the bones to dry and then store in small boxes in the collections cabinets.

The following photos happen to be specimens of Fishers that had been part of the Washington State Fisher Recovery Plan. A partnership by Washington Dept of Fish and Wildlife, the National Park Service and Conservation NW who have been reintroducing more than 250 Fishers into the Cascade Range, Mt Rainier and Olympic Peninsula in a program since 2008.

What will be done is parts of the body will be separated into the mesh containers, right appendages separated from the left appendages so they won't be mixed up.

Fishers—a member of the mustelid or weasel family roughly the size of a housecat that feeds on rodents, hares and even porcupines—were extirpated from WA by the 1930s due to over-trapping, poisoning and fragmentation of their forest habitat. Since Fishers were once native species of Washington, it is hoped the relocated Fishers from Canada will reestablish a sustaining population here.



Fisher (Pekania pennanti)

The Fisher relocation project is still on going. The Burke is the designate repository for all Fisher bodies that are salvaged during this project, so they can continue to provide information to scientists, even in death. Many reintroduced Fishers wear radios, and that allows scientists to find dead ones fairly soon after they die, while the bodies are still in good condition. The collection has almost 20 from this project so far to date.



Before a Fisher skeleton has visited the Dermestid Beetle colony.

The bones of all animals are important for study.

Zooarchaeology is the study of animal remains, including bones, from archaeological sites. For archaeologists, correctly identifying the animal remains from a site may lead to understanding what subsistence strategies and economic

interactions might have occurred at an archaeological site by the people inhabiting them. The bones might provide clues to the kind of environment that existed to support the people and animals living there.

The Burke Collection is considered a library of bone reference for archaeologists and anthropologists.



After a Fisher skeleton has visited the Dermestid Beetle colony and soft tissue removed.

UW BURKE ORNITHOLOGY World's Largest Collection of Spread Wings

Kevin Epperly and Chris Wood are the two collection managers in charge of the Ornithology Collection at the Burke Museum and they maintain a comprehensive collection of approximately 110,000 bird specimens from around the world. Specimen types include study skins, spread wings, bird skeletons, egg sets, nests and frozen tissue samples.

It takes two, as the tasks involved are more than what one person can manage. In addition to preparing, cataloging and curating specimens, they help out with the specimens use by students, researchers, artists and others, and managing loans to and from other institutions. And with all things, there is a fair amount of administrative work as well, wrangling a substantial number of state and federal permits, doing the finances and arranging collection expeditions as well.

The collection is relatively modern, with more than 75% of the total specimens added in the past 40 years, and is used for a variety of purposes, including research, education and art.

The Burke is particularly known for their special collections such as spread wings (the largest such collection in the world over 40,000) and bird tissues (one of the world's largest collection, more than 62,000). They are a very important resource for people studying molt and aerodynamics, and really a unique resource in the world for artists and scientists who are looking at plumage patterns in spread wings.

While their comprehensive holdings include the world's largest series of Pacific Northwest birds, it is also comprised of modern collections from every continent, including unsurpassed modern collections from many localities throughout the former Soviet Union and Mongolia, samples from transects crossing major Australian biogeographic divides, and major new bird collections from the Solomon Islands.

Some specimens are old, like an ivory-billed woodpecker collected in 1873. The oldest bird in the collection is a reed warbler collected in England in 1834.

The museum also adds 500 to 1,500 new birds to its collection each year. About 200 of those come from regular citizens who bring in the birds they find around home.

Salvaging birds you find dead can make an important contribution to the Ornithology Collection. Salvaged birds are prepared as scientific or teaching specimens used by students and researchers around the world.

Each year the Burke Museum takes in hundreds of birds from wildlife rehabilitation clinics and members of the public. Most were hit by cars, died from hitting windows, were killed by cats, or were victims of natural or man-made disasters. Salvaged birds form an important part of the Burke's extensive research collections, and are the core of the Burke's Teaching Collection—used in both K-12 and University education programs.



Wing of Beach Kingfisher
(*Todiramphus saurophagus*)

The Migratory Bird Treaty Act gives federal protection to all but a handful of birds. It is illegal—and a federal crime—to possess or transport most birds (or bird parts) without a permit issued by the U.S. Fish and Wildlife Service.

In practice, however, the local U.S. Fish and Wildlife Service office and the State Department of Fish and Wildlife allow the public to possess birds for the time needed to deliver them to an approved educational institution such as the Burke Museum. Thus, if you call one of these offices having found a dead bird, they will likely refer you to Burke Ornithology. If you cannot immediately bring the bird to the Burke Museum, you should contact them. You should not keep the material for your own use.

How are wings removed? First, the wing is loosed from the body with a scalpel, in a process called “de-articulation.” A scissors is used to sever the wing at its tertial layer—the line of feathers that bridges the body and the wing. Once it's severed, it can be easily snipped free. Then peel the wing back a little and take as much flesh out as you can. This ensures that the wings don't decay, or attract any pests that may infest the precious specimens.

This method allows the wings to be preserved as spreads—if a wing were preserved still attached to a bird, it would stiffen and be impossible to view in full. The Burke Museum is particularly famous because it has such a large collection of spread wings.

The museum doesn't use chemicals on its specimens, relying only on air-drying and bug-free storage to keep them uncontaminated. Placed inside special envelopes, the wings are then slotted into storage cabinets, like a vast catalog of files. Each one bears a tag that links it back to the parent bird, which often lies elsewhere in the collection.

Collections like this provides a record of the current avian world, and build a showcase of diversity. Specially preserving and tagging wings enriches the collection and helps current-day ornithologists provide more groundwork for future researchers.



Skins of Splendid Fairywren
(*Malurus splendens*)

UNDERGRADUATE AWARDS AUTUMN 2022

DONALD S. FARNER SCHOLARSHIP

Lilas Brisk (Chamberlain Lab, UW Medicine)

WALTER & MARGARET SARGENT AWARD

Ezekiel Augustine (Wilson-Mantilla Lab)

Arion Chao (Santana Lab)

Henry Sanford (Leaché Lab)

Ruibing Wu (Fu Lab, UW Chemistry)

JOHN & DOROTHY FRANCO AWARD

Tate Linden (Santana Lab)

Megana Shivakumar (Drain Lab, UW Dept of Global Health)

EXCELLENCE IN BIOLOGY SCHOLARSHIP

Ezekiel Augustine (Wilson- Mantilla Lab)

Graham Bloom

Rolando Cordova-Kelly

Lora Keyte

Dave Young

FRYE-HOTSON-RIGG AWARD

Mira Anders (Strömberg Lab)

Nicholas Gjording (Di Stilio Lab)

Genevieve Stockmann (Di Stilio Lab)

EDITH LUCENA RIEHL SCHOLARSHIP

Tuan Vu (Moltke Lab, UW Dept of Immunology)

PORATH-JOHNSON SCHOLARSHIP

Allison DeCracker (Abrahms Lab)

Blake Delisa

Jakob Luce (Neumaier Lab, VA Puget Sound)

Keith Sanderson (Iloff lab, UW Dept of Neurology)

KATHARINA CASEY LEADERSHIP AWARD

Natalie Au (Bennett Lab, UW Medicine)

Arion Chao (Santana Lab)

Allison DeCracker (Abrahms Lab)

Megan Vadenberg (Summers Lab)

GRADUATE WRITING FELLOWSHIPS AUTUMN 2022

DISTINGUISHED TEACHING WRITING FELLOWSHIP

Jazzmine Waugh (Parrish Lab)

FRYE-HOTSON-RIGG FELLOWSHIP

Robin Fales (Carrington Lab)

KATHRYN C. HAHN WRITING FELLOWSHIP

Hayden Davis (Leaché Lab)

IN NEW GUINEA THEY CALLED HER: THE WOMAN WHO WALKS Evelyn Cheesman

EVELYN CHEESMAN OBE

Born 1881-1969 England



Evelyn Cheesman was an English entomologist best known for her extensive solo expeditions in the South West Pacific. Over the course of her trips, she collected around 70,000 specimens of insects, plants and other animals for the Natural History Museum. She was the first Western scientist to thoroughly explore the biogeography of the South West Pacific Islands (includes, Australia, Cook Island, Fiji, French Polynesia, Kiribati, Marshall Islands, Federated States of Micronesia, Nauru, New Zealand, Niue, Palau, Samoa, Solomon Islands, Tonga, Tuvalu, Vanuatu) and to link the evolution of the fauna to the Asian subcontinent.

Cheesman had set her mind on becoming a veterinary surgeon but in 1906 the Royal College of Veterinary Surgeons was not yet admitting women and would not until the law changed in 1919. Instead she became the Assistant Curator of Insects at ZSL London Zoo in 1917 and in 1920 was made the first female Insect House Curator. At the time the Insect House was dilapidated and almost empty of live specimens. Evelyn acquired a new stock of insects using a billycan and net, and invited children near and far to contribute. Filled now with newly bred butterflies and native British fauna, the Insect House thrived under her care.

In 1923 Cheesman went on her first expedition to the Galapagos Islands. It was on this trip, she acquired important new skills for collecting, which included how to skin and preserve lizards & birds and mount mosquitos for Museum collections. After the Galapagos, she collected in the Marquesas Islands and the Tuamotu Atolls in 1924 and then an expedition to the Society Islands in 1925. She officially left the zoo in 1926 and made many further expeditions in the New Hebrides and the South West Pacific that included New Guinea and New Caledonia. In New Guinea, they called her 'the woman who walks' because of not using sedan chairs to travel. At age 48, She did her first expedition to collect insects and small animals for the Natural History Museum. Cheesman went back time and time again to the South West Pacific and in different seasons and as a result her collections tell us a great deal about species dispersal, extinction, climate change and of course the biogeography and the evolutionary history of those islands.

Conditions were a constant challenge for Cheesman, who battle with bouts of tropical disease such as dengue and malaria and stumbled across deadly snakes and spiders. She once got so caught up in the low hanging webs of the Nephila spider on Gorgona Island, she had to spend several hours freeing herself with a nail file. After that experience, Cheesman never travelled without a machete at her side. Her solo expeditions were partially funded by the Natural History Museum but were for the most part, self-funded. Cheesman supplemented her meagre income by writing 16 popular books chronicling her adventures and discoveries. In 1955, Cheesman was awarded an OBE (OBE - Officer of the Most Excellent Order of the British Empire) and a civil list pension for her contributions to entomology. She continued to work at the museum, writing and classifying specimens, until her death in 1969.

DESCRIBED AS WITTY, ACERBIC, CLEVER AND COURAGEOUS Dorothea Minola Bate

DOROTHEA MINOLA BATE

Born 1878-1951 Wales



In 1898, when she was just 19 and with no formal education, Bate talked her way into a job at the Natural History Museum sorting bird skins in the Dept of Zoology's Bird Room and later preparing fossils. This was a time when it was almost wholly a male preserve; women were not employed on the scientific staff until 1928. Dorothea was always an unofficial scientific worker, paid piecemeal depending on the number of fossils she prepared. Although not a member of staff, such was her ability that in 1924 she was appointed Curator of Ice Age birds and mammals.

In 1901, Bate published her first scientific paper, "A short account of a bone cave in the Carboniferous limestone of the Wye Valley", which appeared in the Geological magazine about bones of small Pleistocene mammals. That same year, she visited Cyprus staying for 18 months at her own expense to search for bones there, finding twelve new deposits in ossiferous caves among them bones of the species *Hippopotamus minor*. In 1902, with grant money from the Royal Society, she discovered in a cave in the Kyrenia hills, a new species of dwarf elephant which she named *Elepha cyriotes*. She later undertook expeditions to many other Mediterranean islands, including Crete, Corsica, Sardinia, Malta, and the Balearic Islands, publishing work on

their prehistoric fauna. In Majorca and Menorca, Bate covered the remains of a small animal unique to those islands, which is so specialized there isn't even a common name for it. She called it *Myotragus*, mouse goat. It's a small goatly antelope, with extraordinary front teeth usually only found in rodents. It is a marvelous example of evolution adaptation, survival - and extinction. It is on display in the Natural History Museum.

Bate put herself at extreme risk during her excavations, contracting malaria in Cyprus, scarlet fever in Majorca and nearly starving in Crete. In west Crete, on being told of a bone cave inaccessible by boat, she climbed down the cliff, swam to the cave, excavated some fossil bones there, and swam back, carrying her geological hammer and bag containing her finds. And later she would add dynamite to her normal things she carried.

Bate also worked alongside the archaeologist Professor Dorothy Garrod in the Caves of Nahal Me'arot, where excavations had commenced in 1928. She was the first to study the faunas of the area, her stated research aim being the reconstruction of the natural history of the Pleistocene (Ice Age) fauna of the Levant region. She described several new species, and identified several species that had previously not been known to have existed in this area in the Pleistocene. She constructed one of the first quantitative curves of faunal succession, and in reference to ancient climate she identified a faunal break between primitive and modern mammal communities during the Middle of the Ice Age.

CURATOR OF THE ACADEMY HERBARIUM AT AGE 35 IN 1894 Alice Eastman

ALICE EASTWOOD

Born 1859 -1953 Canada



In 1853, the California Academy of Sciences became the first scientific institution in the western United States. That same year the founders of the Academy made a resolution, that they would “highly approve the aid of females in every department of natural science and that we earnestly invite their cooperation.” This was a significant departure from their east coast counterparts—the Academy is one of the earliest known scientific organizations in the United States to collaborate with, hire, and pay women curators.

Many of the Academy’s earliest female contributors had married and raised families before they could devote any significant amount of time to scientific study. The Academy’s first paid female curator, hired in the 1883, was Katharine Brandegee (age 67), who had earned her MD from the U of California in 1878.

Brandegee met Alice Eastwood when she traveled to Denver to inspect Eastwood’s collections. Eastwood was also self-taught, using published guides to study botany during the decade she spent teaching at her former high school, and collecting specimens whenever she went on vacation. Brandegee, clearly impressed, gave up her salary at the Academy in order to hire Eastwood to help her with the Academy’s herbarium in 1891. Eastwood’s botanical prowess so impressed Brandegee that in 1892 Brandegee offered Eastwood the position of joint Curator. When Brandegee retired in 1894, Eastwood took over as Curator of

Botany and head of the department (at the age of only 35), a position she held until retiring in 1950 at age 90.

The most well-known story about Eastwood involves a heroic deed after the 1906 earthquake. One unconventional act as Curator was to segregate the botanical type specimens rather than keeping them with the rest of the collection. This proved to be a prudent decision. On April 18, 1906, a massive earthquake struck the region, followed quickly by fires that burned for three days and ravaged the city. Over 500 city blocks were consumed and over 28,000 area buildings were destroyed, including the California Academy of Sciences. Following the quake, Eastwood and a small group of Academy staff and curators convened to save whatever they could from the coming fire. Since the type specimens were housed together, separate from the rest of the Herbarium, Eastwood was able to save 1497 irreplaceable botanical types and key archival materials while the rest of the collections were lost. She worked tirelessly over the subsequent days, moving the specimens around the city to keep them safe, protecting them while her own home and possessions were lost in the blaze.

Eastwood leaves to work at the Gray Herbarium in Harvard for 2 years as staff assistant and travels to different herbariums around the world. In 1912 she returns to California Academy to help rebuild the herbarium at Golden Gate Park. Between 1912-1949 Eastwood adds 340,000 specimens to the Academy’s herbarium.

FIRST WOMAN CURATOR AT THE SMITHSONIAN IN 1956 Doris M Cochran

DORIS MABLE COCHRAN

Born 1898-1968 Pennsylvania



While an undergraduate student at George Washington University (A.B. 1920, M.S. 1921 both in Zoology) and at the same time attending classes at the Corcoran Art School (becoming a scientific illustrator for her own works but also for those of her colleagues) she worked for the War Department and became an Aide in the Division of Herpetology at the United States National Museum in 1919. Although the museum was under the curatorship of Leonhard Stejneger, Cochran was responsible for the administration of the herpetological collections.

In 1927 she became Assistant Curator. Cochran had continued her studies in Zoology and in 1928 received her MA from John Hopkins University and then her PhD from the University of Maryland in 1933. Then in 1942, became Associate Curator just prior to Stejneger’s death. As Stejneger grew older, more of the work of the Division fell to Cochran and following Stejneger’s death in 1943, she became acting head of the Division and supervised the Division alone until 1964 when Jame Peters was appointed associate curator. Finally, she officially became the first woman Curator at the Smithsonian in 1956 (age 56) and remained until her retirement in 1968 on her 70th birthday.

Cochran’s research was focused primarily on the herpetofauna of the West Indies and South America, particularly Haiti. She published 90 taxonomic papers between 1922 and her death (four days after her retirement in 1968) in which she described eight new genera and 125 species and subspecies as well as wartime booklets for the military identifying venomous reptiles. Her 20 years of studies of the West Indies culminated in *The Herpetology of Hispaniola* in 1941. She visited Haiti twice, in 1935 and 1962–1963. In Haiti she would work with Adolfo Lutz and his daughter, Bertha noted Brazilian herpetologists.

When she visited Brazil, Cochran received a donation of 3,000 Brazilian frogs from Adolfo Lutz, and wrote about South American frogs in *Frogs of Southeastern Brazil* in 1954 and *Frogs of Colombia* in 1970 (posthumously).

Over the course of her career, Cochran named nearly 100 new species and 6 new genera and published Seminole including *Living Amphibians of the World* (1961) which has been translated into six languages. She gave a number of radio talks and speeches on reptiles and amphibians to clubs. Cochran’s collaborative nature, fearlessness and dedication to uncovering the secrets of the natural world continue to inspire scientists today.

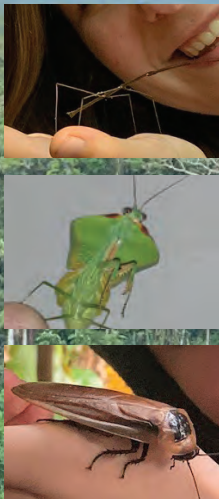
A BIOLOGY UNDERGRAD'S EXPERIENCE / ECOL-EVOL-CONSER OPTION Kiara Milcoff

Some of my earliest memories are of flipping over rocks looking for bugs and spiders, catching snakes in the yard and playing with the microscope my mother bought me. Somehow while navigating through my teenage years, I lost touch with that part of myself. After graduating with an Associate's Degree at 17, I felt aimless and without a clear vision for my future. I decided the best thing to do was to take a break from school and explore my passions. Through reading books by Jane Goodall and Edward O. Wilson, spending countless hours in the forest, and becoming the proud parent of 13 tarantulas and 20 praying mantises, I rediscovered my love for the natural world and the biological mechanisms behind it.

In August of 2018, I made the last-minute decision to enroll in Autumn quarter at UW to begin the pursuit of my career in biological research. I found my transition into the strenuous STEM courses of UW to be so challenging that I contemplated dropping out. I met with my advisor for advice and he recommended I join an RSO to help improve my school experience. We searched together and found Hoja Nueva, an RSO led by SEFS graduate student Samantha Zwicker. It was based around her research and non-profit in the Peruvian Amazon, a place I had been dying to visit since I was a young child. I reached out to

her and quickly became involved in her research. The bulk of this involved assisting her in identifying individual ocelots from camera trap images using their unique rosette pattern. Collaborating on this research gave me a greater sense of purpose at UW that helped me push through the challenges and believe in myself.

When I was 9, I wrote about running away to the Amazon Rainforest to explore the incomparable biodiversity. After working with Sam for several months, she offered me the opportunity to intern at Hoja Nueva in the Peruvian jungle. A dream come true! During summer of 2019 I traveled to Hoja Nueva and spent a month in the remote jungle lodge with no internet or service, limited power and plumbing, and ice-cold showers. It was the greatest experience of my life. I helped with herpetology surveys, scat collection, soil samples and caring for their rescue peccary, Billy. I was captivated by the biodiversity and spent my free time chasing insects and catching frogs. During this time, the documentary "Wildcat" was being filmed about Hoja Nueva and I got to witness the process. I even have a tiny background clip in the film! I felt more at home in the Amazon than ever before and realized that I wanted to dedicate my life to researching tropical insects.



Insects caught in Hoja Nueva.



Kiara and rescue peccary, Billy at Hoja Nueva in the Peruvian Jungle

Peruvian Jungle, the Burke, Research in the Leaché Lab, Research Paper & Symposium

Meanwhile, during spring quarter of my first year, I attended the undergraduate research symposium and heard a talk by Shanelle Wikramanayake, an undergraduate in Adam Leaché's lab. I was incredibly inspired by her research in herpetology and wanted to get involved. I sent Adam an email expressing my interest in his work and we quickly set up a meeting.

During our meeting, Adam told me about an upcoming project his lab was taking on in collaboration with the Wyoming Game and Fish Department. The goal was to determine the species identity of a previously unsampled population of *Sceloporus* lizards in the Laramie mountain range of Wyoming. This population of lizards fell between the ranges of *Sceloporus tristichus* and *Sceloporus consobrinus*; because this genus is known for being cryptic, it was necessary to use molecular methods to determine species identity. I was immediately interested in the project and Adam suggested I take over with his help. I enthusiastically accepted his offer!

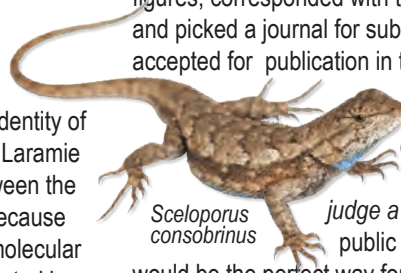
In addition to Adam's role as a researcher, he is the curator of Herpetology at the Burke Museum. Through joining his lab, I was given the incredible opportunity to volunteer with the Burke for opening weekend. Together, our lab skinned a Komodo dragon specimen that had been donated to us by the Woodland Park Zoo. Being hands on with this legendary, 150lb animal was one of the coolest experiences of my life. Watching the kids standing by the viewing window with fascinated expressions reminded me of my own childhood curiosity for science. I was so grateful to be able to help give these kids an inside look into a herpetology lab. We were even featured on a local news channel!



Kiara skinning the Komodo Dragon at the opening weekend of the New Burke. In the upper right of this photo is the large window for visitor viewing to the specimen prep room and at this time it is mostly young kids watching.

In the following months, I read papers, books, and had meetings with Adam to become more familiar with the field of phylogenetics while periodically volunteering in the Herpetology lab at the Burke. I learned wet lab techniques for DNA extraction and replication with the help of Adam, Shanelle and other members of the lab. I sent the DNA I extracted

out for sequencing and performed data analyses on the results. After going over the data with Adam, we had the answer to our question! Our population of interest was *Sceloporus consobrinus*. Adam suggested I write a paper about our results and submit it for publication. Over the course of a year, we exchanged drafts back and forth, created figures, corresponded with the Wyoming Game and Fish Department, and picked a journal for submission. In June of 2021, our paper was accepted for publication in the *Western North American Naturalist*.



Sceloporus consobrinus

To celebrate our publication, I decided to do a 10-minute talk in the 2022 Undergraduate Research Symposium entitled "Don't judge a lizard by its morphology!" I had a big fear of public speaking and decided that the symposium would be the perfect way for me to overcome it. My nerves were in high gear after fumbling through my practice run for the Leaché lab. But when I began speaking on presentation day, I was overcome with pride and gratitude for having partnered on such a special project and the jitters disappeared. Afterwards, I was approached by Gabriela Chavarria, the Burke Museum Executive Director, who gave me high praise for my presentation. Come to find out, she had been a student of Edward O. Wilson at Harvard! I ended up reaching out to her for a meeting and she has since become one of my most important mentors, advising me on steps to take towards my career goals.



Kiara Milcoff speaking at the 2022 Undergraduate Research Symposium

My experience going to UW, working with Adam Leaché, publishing a paper, volunteering at the Burke and making connections with their staff were invaluable for my career. I graduated with a Bachelor's in ecology evolution and conservation biology in December; I am currently set to TA invertebrate zoology at UW with Professor Kenneth Sebens for Winter quarter. My story with the Burke isn't over. I plan to seek further volunteer opportunities in the invertebrate collection.

I am incredibly grateful for the education I got at UW, the time I spent in the Amazon jungle, volunteering at Burke, and my research experience under Adam Leaché that made me fall even more in love with the scientific method. Most of all, I am thankful to be pursuing a career in biology and following my passions. I will go on to get a PhD in tropical entomology and share my love for misunderstood creatures with the world.

TRIBETA TUTORING ONLINE & IN PERSON: Monday - Thursday: starts Mon January 17

TriBeta Tutoring will be offered Winter Quarter in-person at the Hitchcock 4th floor study lounge and online over Zoom.


Tutoring starts during the third week of the quarter on January 17th and ends the week before final exams.

Tutors will be present in person (at HCK 4th floor lounge) and over Zoom, Mon-Thurs to answer your questions about BIOL 180/200/220 and GENOME 361. Zoom link and finalized schedule are on our website: <https://sites.google.com/view/uwtribeta/coaching>

IN-PERSON INSTRUCTIONS: Come to HCK 4th floor study lounge, scan the QR code posted on the wall to log-in. A tutor should be present to assist you!

ONLINE INSTRUCTIONS: Click on the Zoom link on our website to join. When you join, a tutor should be present to assist you. Tutors will have a tutor designation in their Zoom name. If multiple students are present in the meeting, then the tutor might move you into a “breakout” room so that they can assist you more individually or encourage you to work with other students in your class. If no tutors are present in the meeting, then it is likely all tutors have moved into breakout rooms to assist other students. Please wait a few minutes for a tutor to become available.

WE PROVIDE FREE TUTORING FOR INTRODUCTORY BIOLOGY (BIOL 180/200/220) and GENOME 361 students at the University of Washington. Our tutors are undergraduate students at the UW who have excelled in the introductory biology classes and are eager to help other students succeed too. Website of our tutoring page: <https://sites.google.com/view/uwtribeta/coaching>



TriBeta Tutoring

Prepare for tests Develop Strong Study Habits Clarify difficult concepts Join our community

FREE TUTORING for BIOL 180/200/220 students
Our tutors are students who excelled in this challenging series and are eager to help you succeed!

2022-2023 Executive Board



TriBeta Biological Honor Society

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Our website: <https://sites.google.com/view/uwtribeta/home>

Full Membership is eligible to any student who has completed two Intro Biology courses (180/200) and one additional biology course with a GPA of 3.0 or higher.

WHAT IS TRIBETA?

Beta Beta Beta is a national honor society dedicated to improving the understanding and appreciation of biological studies. It is a platform for students to earn recognition for their efforts and accomplishments while networking with other students and UW Biology staff with the same interests.
In short: a really great organization.

Watch for Events Coming up!

BIOLOGY STUDENTS FOR EQUITY: Lookout for Future Events on Instagram or Facebook



BSE



Greetings from Biology Students For Equity

We are an RSO started about 4 years ago, but never more relevant. “Unprecedented” is overused, but you know now, more than ever, we need community, safe spaces for difficult conversations, and action to help make the department climate kinder and more productive for our BIPOC (black, indigenous, people of color) community members.

We seek to give undergraduates a voice through our collaboration with the Biology department’s Diversity and Equity Committee as well as foster community through our undergraduate mentorship program. Our main goals are to discuss, call out, and address inequities in STEM. Follow us on our [Instagram or Facebook Page \(@biologystudentsforequity\)](#) to keep up to date with future events.

If you are interested in joining our email list, becoming a member, or want to learn about how to plug in to our community, please email us at

biologystudentsforequity@gmail.com.

We hope to work with you and for you.

All Humans Are Welcome.

BIO BOOK CLUB: *Why Fish Don't Exist; A story of Loss, Love & the Hidden Order of Life* by Lulu Meyers

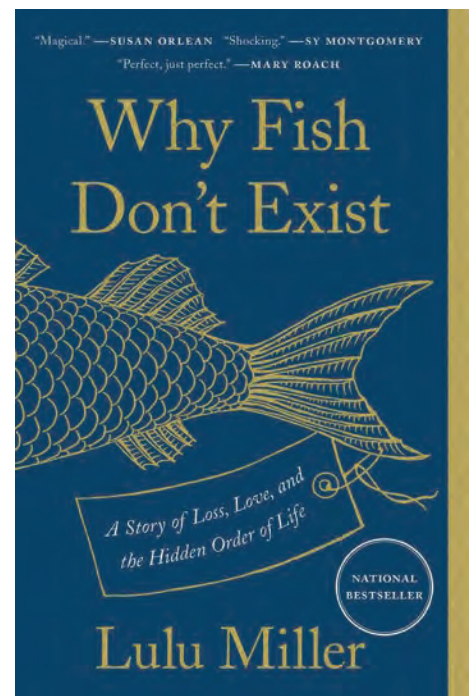
Get Ready for Bio Book Club! We will choose a fiction or non-fiction book each quarter with a scientific thread, but that also examines social, cultural, and environmental topics.

Please feel free to send book recommendations to **Janet Germeraad** at janetjg@uw.edu.

A Best Book of 2020: The Washington Post * NPR * Chicago Tribune * Smithsonian

From the host of NPR’s Invisibilia, this debut book tells the story of a scientist named David Starr Jordan who set out to discover as many of the world’s fish as he could, building one of the most important specimen collections ever. But in 1906, the San Francisco earthquake hit, sending over a thousand of his fish, housed in fragile glass jars, crashing to the floor. As Jordan painstakingly remade his collection, he introduced an innovation that, he believed, would protect it against the chaos of the world. Miller blends science and biography to investigate the age-old question of how to go on when everything seems lost.

Part biography, part memoir, part scientific adventure, *Why Fish Don't Exist* is a wondrous fable about how to persevere in a world where chaos will always prevail.



PAUL'S PECULIAR PLANT PICK FOR WIN QTR: Ant-Plants in the Epiphytic *Hydnophytinae*

Many plants from several different families have developed mutualistic relationships with ants. One such group is the subtribe *Hydnophytinae* (*Rubiaceae*, *Psychotriaceae*).

There are 117 species of ant plants in this group, separated into five genera: *Hydnophytum*, *Myrmecodia*, *Myrmephytum*, *Anthorrhiza*, and *Squamellaria*. The current collection at the University of Washington contains examples in the first three genera housed in room 6.



PAUL BEEMAN
Greenhouse Plant Technician

The plants are native to Southeast Asia, the islands of the Philippines, Indonesia, and Borneo, northern Australia and as far east as Fiji.

There is a mutualistic relationship between these plants and certain arboreal ant species, hence the common name ant plants. They provide a large protective habitat which shields the ants from the elements and predators. The ants provide nutrients for the plant and act as sentries, killing small herbivores and discouraging larger ones.

These are epiphytic plants that grow very large tuberous, modified stems called caudices attached to the branches and trunks of trees. The stems contain many chambers or domatia that the ants use as homes. The domatia form naturally in the caudices of these plants even in the absence of symbiotic ants. It is thought that the tunnels and chambers of the domatia provide cooling to the internal tissues of the caudex (and the ant colony) and significantly reduce the overall weight of the plant so it is less likely to prematurely fall out of the tree and die.

The tunnels and chamber walls of the domatia are mostly smooth, but certain areas are lined with lumpy absorptive tissue (modified roots). Ants use these areas to defecate or deposit other debris like the remains of insect prey and the bodies of dead ants, from which nutrients are absorbed by the plant. The plants thus can functionally gather nutrients from a much larger area (via the ants) than the roots cover.

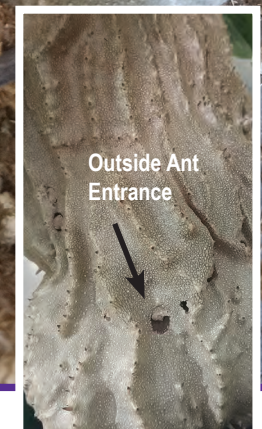


Flowers of *Myrmephytum selebicum*

The plants produce tiny, usually white flowers that are self-fertile and produce small orange or red fruit containing 2 to 8 seeds. The seeds in berries eaten by birds survive transit through their gut and stick to surfaces where the birds defecate. The ants will also chew the seeds out of the berries and plant them nearby, producing more housing for the colony.



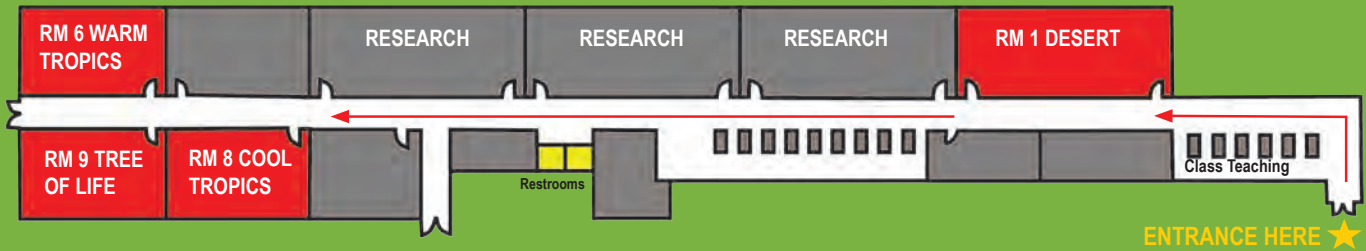
Cross-section of *Myrmecodia tuberosa*



Myrmecodia tuberosa

GREENHOUSE PUBLIC VISITING HOURS: Thursdays 1:00 to 4:00 pm

SOMETHING IS BLOOMING, 365 DAYS OF THE YEAR.



Our Teaching Collection includes plants that are found only in world class botanic gardens. The collection is located in four rooms in the Greenhouse and shown in red above. We ask that when you enter, there may be a class in session. If so, please walk quietly through to visit the four rooms that are open to the public.

GH1 Desert Room:

Massonia pustulata

This plant is pollinated by rodents including gerbils. Pseudo gerbil next to plant, in window of room.



GH8 Cool Tropic:

Hoya odorata

This plant's common name is the Fragrant Wax plant. This species has an intensely sweet fragrance.



GH6 Warm Tropics:

Nescodon mauritanus

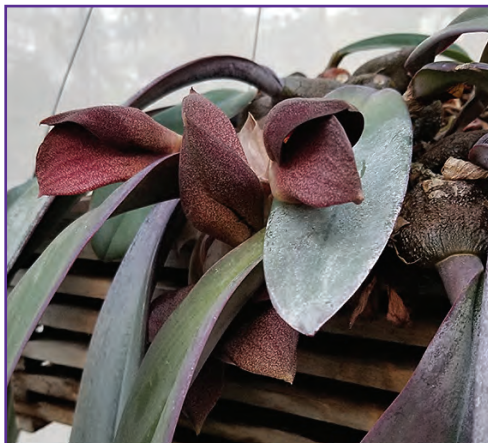
This plant produces red nectar and is pollinated by the day geckos (*Phelsuma ornata*).



GH9 The Tree of Life:

Bulbophyllum orthosepalum

This plant has single flowers that look like a bird's beak. The flowers have the smell of rotten meat.



ACADEMIC SERVICES FOR UNDERGRADUATE & GRADUATE

HOW DO I TALK TO AN UNDERGRADUATE ACADEMIC ADVISOR? Use Email or Zoom!

We welcome UW and prospective students to contact us with any questions regarding a Biology option. Here are the advisors, their emails and their favorite part of the Burke Museum.



Janet Germeraad
Academic Services Director
Janetjg@uw.edu

Amazing Life Exhibit - I like how this exhibit connects all living things - it is a reminder that living is a forever on going process. wow!



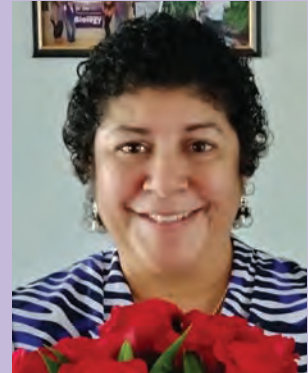
Jason Patterson
Academic Counselor,
Senior
patterj@uw.edu

The scientist in a window is an interesting concept and fascinating as a teaching tool to show standard activities that happens in some lab research.



Andrea Pardo
Graduate Program Manager
acroz@uw.edu

I love the native American collections and historical items!



Julie Martinez
Program Coordinator
juliebio@uw.edu

I enjoyed the T-Rex and the Fossil exhibit and didnt know so much tedious work goes into getting the pieces ready for the collection. Truly amazing.



WINTER QUARTER 2023 UNDERGRAD ACADEMIC ADVISING

ZOOM Drop-In Advising Hours:

Monday - Thursday 9 a.m. - 12:00 p.m. and 1:00 p.m. - 4:00 p.m.

In-Person and ZOOM Appointments (other than Drop-Ins) by appointment only. Contact Jason or Janet directly.

Please consult the website first for general answers on: advising, admission, degree plans, matrix of courses, and forms at: <http://www.biology.washington.edu/programs-and-courses>

For general questions, you may reach us at: bioladv@uw.edu or at 206-543-9120

Current / prospective students, parent, and community questions not addressed by our webpage will receive an answer. Academic Services Staff will closely monitor this email account to ensure a timely response and make phone or other Zoom appointments to address concerns.

