

BIOLOGY STUDENT
NEWSLETTER

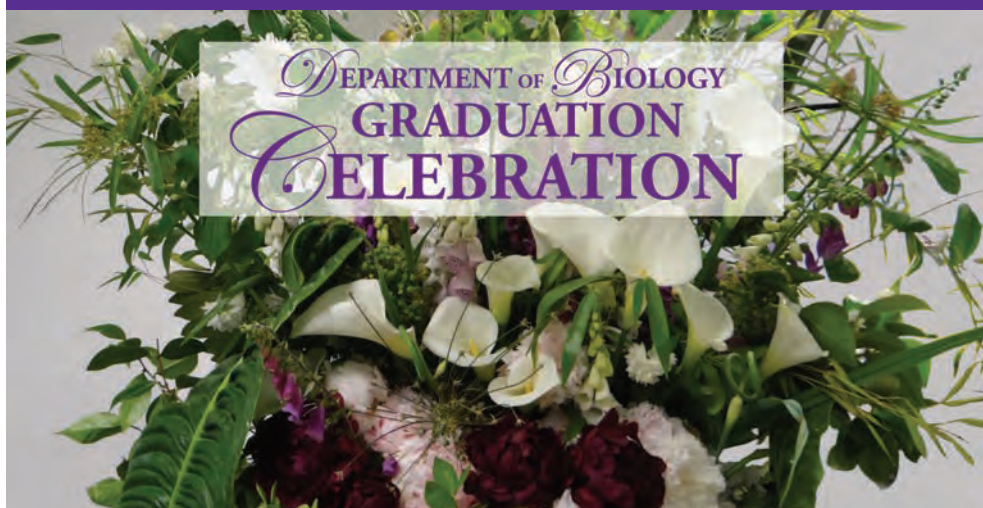
SPRING 2021

ISSUE 38

IMPORTANT DATES
FOR SPRING QUARTER

Mar 29	First Day of Instruction
Apr 4	Last day to drop a class without a fee thru MyUW
Apr 5	All Courses Require Entry Codes to Add
Apr 9	Last Day to apply to the Biology Major for Summer
Apr 11	Last Day to drop a class without the use of the ANNUAL DROP
Apr 12	Summer Reg Priority Period 1
Apr 16	Deadline to Apply for Spring Graduation
Apr 18	Last Day to Add a Class through MyUW
Apr 22	Earth Day
Apr 25	Penguin Awareness Day
May 5	Last Day to Apply for Grad Reg Priority (GSP) for Aut/Win
May 16	Last Day to Change courses to S/NS until after the quarter ends
May 20	Start of Sum Reg Period 2
May 21	UG Research Symposium virtual
May 31	Memorial Day Holiday
Jun 4	Last Day to Withdraw from all Spr Qtr classes or use your Annual Drop
Jun 7-11	Final Examination Week
Jun 11	Dept of Biology Graduation Celebration to be virtual goes live at 1:30 pm
Jun 7-11	UW Big Commencement Ceremony
Jun 16	S/NS will reactivate for Spr due to extraordinary circumstances
Jun 21	Spring Quarter Starts

2021 BIOLOGY GRADUATION CELEBRATION IS VIRTUAL!



Friday June 11, 2021, the Biology Graduation Celebration video will go live at 1:30 pm.

We do have a guest speaker as well as short speeches from the Chair of the Department, David Perkel; Chair of the Graduate Program, Caroline Strömberg; and Chair of the Undergraduate Programs, Jennifer Ruesink. A wonderful setup for virtual hoodings of PhD candidates accompanied by a voice over of their PI. There will be a reading of the candidates of Department Honors and the Honors in the College of Arts and Sciences, as well as special honors like Husky 100. Last, we are planning to show photos of our Graduating Seniors.

We will be sending instructions on how to participate to our graduating seniors for our **Biology Graduation Celebration video**. At this time we are waiting for Office of Commencement to chose a company that will enable us to show graduation photos and information. You will probably hear from us near the end of April.

If you are participating in the BIG ALL CAMPUS Graduation Commencement, all graduating seniors need to look for information coming from the Office of Commencement in the month of April. UW Commencement have their own requirements to participate.

PLAN FOR THE 2022 BIOLOGY GRADUATION CELEBRATION

With the Pfizer, Moderna and the Johnson & Johnson vaccines becoming more available and the current push to vaccinate everyone, everywhere in the world, our present plan is to have an in-person Biology Graduation Celebration at Hec Ed in 2022.

The Department of Biology will be offering to all undergraduates and PhD candidates who completed their Biology degrees in 2020 and 2021 the opportunity to join the Biology Graduation Celebration for the 2022 graduates.

We have Hec Ed reserved and it seats 10,000 people. Depending on the rsvps that will come back we may have to limit the family/friends that can come.



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

Biology Academic Services in-office advising & services are closed until further notice, please do not call & leave a message.

We welcome UW and prospective students to contact us with any questions regarding a Biology option. Here are the advisors, their emails and a little bit about each one of them.



Janet Germeraad
Academic Services Director
Janetjg@uw.edu

Janet loves witnessing the wonderful emergence of Spring. The birds, the flowers, and being able to walk barefooted in the grass.



Jason Patterson
Academic Counselor, Senior
patterj@uw.edu

Since lockdown of last year, Jason has had six different hair colors. You will have to zoom with him to see his current hair color.



Sheryl Medrano
Academic Counselor, Senior
smedrano@uw.edu

Sheryl likes to read books, chase her feisty toddler around and eat sourdough bread.



Julie Martinez
Program Coordinator
juliebio@uw.edu

Julie enjoys outdoor camping, fishing, hanging out with family and listening to country music by the campfire.

HELP US GIVE YOU QUALITY TIME ON YOUR ZOOM APPOINTMENT!

1) See if any of your questions can be first answered on:

- Our Dept of Biology website <https://www.biology.washington.edu/programs/undergraduate>
- The UW website <https://www.washington.edu/coronavirus/autumnquarter/>

2) Make an appointment with an advisor:

- Email either a specific advisor or bioladv@uw.edu with days and times you have available
- Please include your name and student number in your emails
- Review your DARS and/or handout prior to your meeting
- Use your MYPlan to mark classes of interest

3) Then when we zoom with you, we have more time to:

- Get to know you
- Develop unique academic plans based on what you are curious about
- Navigate opportunities to refine your academic interests
- Prepare you for the world of work
- Help you cope with the typical stress & anxiety of being in college (overwhelming even without a global pandemic)

COVID TESTING

Any students coming to campus are strongly encouraged to participate in the testing that is available on campus. If students enroll in the testing, they will be contacted to do a daily attestation. More information about that is here:

<https://www.washington.edu/coronavirus/students/>

All students, regardless of whether they are coming to campus or not, are asked to commit to the Husky PACK Pledge and instructors/TAs should remind and encourage their students to commit to that, but it will not be recorded or monitored. <https://www.washington.edu/coronavirus/pack-pledge/>

THE 51ST ANNIVERSARY OF EARTH DAY “Restore Our Earth” Thursday April 22, 2021

Earth Day is an annual event celebrated around the world on April 22 to demonstrate support for environmental protection. First celebrated in 1970, it now includes events coordinated globally by the Earth Day Network in more than 193 countries.

The first Earth Day was in 1970. US Senator Gaylord Nelson, after seeing the damage done by a 1969 massive oil spill in Santa Barbara, California, was inspired to organize a national “teach-in” that focused on educating the public about the environment.

Nelson recruited Denis Hayes, a politically active recent graduate of Stanford University, as national coordinator, and persuaded U.S. Rep. Pete McCloskey of California to be co-chairman. With a staff of 85, they were able to rally 20 million people across the United States on April 20, 1970. Universities held protests, and people gathered in public areas to talk about the environment and find ways to defend the planet.

The day also fell after the anniversary of the birth of noted conservationist John Muir. The National Park Service, John Muir National Historic Site, has a celebration every year on or around Earth Day (April 21, 22 or 23), called Birthday-Earth Day, in recognition of Earth Day and John Muir’s contribution to the collective consciousness of environmentalism and conservation.

“Groups that had been fighting against oil spills, polluting factories and power plants, raw sewage, toxic dumps, pesticides, freeways, the loss of wilderness, and the extinction of wildlife suddenly realized they shared common values,” according to a history of Earth Day by the Earth Day Network, which was founded by the event’s organizers to promote environmental citizenship and action year-round.

President Richard Nixon led the nation in creating the Environmental Protection Agency which followed with successful laws including the Clean Air Act, the Clean Water Act and the Endangered Species Act.

Reflecting on the 10th anniversary of Earth Day, US Senator Gaylord Nelson of Wisconsin wrote in an article for EPA Journal, “It was on that day that Americans made it clear that they understood and were deeply concerned over the deterioration of our environment and the mindless dissipation of our resources.”

In 1995, President Bill Clinton awarded Nelson the Presidential Medal of Freedom for being the founder of Earth Day. This is the highest honor given to civilians in the United States.

The Biden Administration has decided to convene a global climate summit on Earth Day 2021.



Editor's Notes: My First Earth Day Experience



When I participated in the first Earth Day event in 1970, all classes were cancelled for the day and we attended an assembly on Earth Day's creation and purpose. The presenters emphasized just how important it was to take care of our earth, for us and for future generations.

That same year, our French teacher took us on a field trip to the docks in Ballard to meet and speak with Jacques Cousteau. Sadly, Jacques was unexpectedly pulled away to a meeting but we did get the opportunity to practice our French with his crew. They gave us a tour of the Calypso and we got to climb into the observation chamber in the bow to look out into the water.

Not long after, I read Rachel Carson's Silent Spring for the first time and my views of Earth Day and environmental protection changed for the better.

In honor of Earth Day, here are four scientists who sought to understand our oceans and worked tirelessly to make this world a better place for all.

INSPIRING NEW GENERATIONS TO PROTECT THE LIVING WORLD Rachel Carson

RACHEL LOUISE CARSON

Born May 1907- April 1964 Pennsylvania



Rachel Carson, writer, scientist, and ecologist, grew up simply in the rural river town of Springdale, Pennsylvania. Her mother bequeathed to her a life-long love of nature and the living world that Rachel expressed first as a writer and later as a student of marine biology. Carson graduated from Pennsylvania College for Women (now Chatham University) in 1929, studied at the Woods Hole Marine Biological Laboratory, and received her MA in zoology from Johns Hopkins University in 1932.

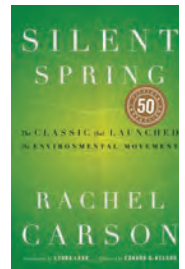
She was hired by the U.S. Bureau of Fisheries to write radio scripts during the Depression and supplemented her income writing feature articles on natural history for the Baltimore Sun. She began a fifteen-year career in the federal service as a scientist and editor in 1936 and rose to become Editor-in-Chief of all publications for the U. S. Fish and Wildlife Service.

She wrote pamphlets on conservation and natural resources and edited scientific articles, but in her free time turned her government research into lyric prose, first as an article "*Undersea*" (1937, for the Atlantic Monthly), and then in a book, *Under the Sea-Wind* (1941). In 1952 she published her prize-winning study of the ocean, *The Sea Around Us*, which was followed by *The Edge of the Sea* in 1955. These books constituted a biography of the ocean and made Carson famous as a naturalist & science writer for the public.

Carson resigned from government service in 1952 to devote herself to her writing. She wrote several other articles designed to teach people about the wonder and beauty of the living world, including "*Help Your Child to Wonder*," (1956) and "*Our Ever-Changing Shore*" (1957), and planned another book on the ecology of life. Embedded within all of Carson's writing was the view that human beings were but one part of nature distinguished primarily by their power to alter it, in some cases irreversibly.

Disturbed by the profligate use of synthetic chemical pesticides after World War II, Carson reluctantly changed her focus in order to warn the public about the long-term effects of misusing pesticides. In *Silent Spring* (1962) she challenged the practices of agricultural scientists and the government and called for a change in the way humankind viewed the natural world.

Carson was attacked by the chemical industry and some in government as an alarmist, but courageously spoke out to remind us that we are a vulnerable part of the natural world subject to the same damage as the rest of the ecosystem. Testifying before Congress in 1963, Carson called for new policies to protect human health and the environment. Her witness for the beauty and integrity of life continues to inspire new generations to protect the living world and all its creatures.



ELEFAN, FishBase & HIS WORK ON THE EFFECTS OF OVERFISHING Daniel Pauly

DANIEL PAULY

Born 1946 Paris, France



Daniel Pauly is a French-born marine biologist, well known for his work in studying human impacts on global fisheries. He is a professor and the project leader of the **Sea Around Us Project** at the UBC Institute for the Oceans and Fisheries at the University of British Columbia.

For the first 16 years of his life, Pauly lived an inward life in La Chaux de Fonds, Switzerland as he was mixed race in an all white town, finding solace in books/reading and model construction. He decided on Fisheries Biology at the University of Kiel, Germany, where he attended for his bachelors, masters and PhD. His key mentors were Charles Darwin and Rachel Carson. He had hoped to work on fish in the tropics where he felt he would fit in better (but it didn't quite end up working out that way) and to devote his life to an applied job where he could help people.

After his Ph.D., Pauly worked for 15 years at the International Center for Living and Aquatic Resources Management (ICLARM), in Manila, Philippines. Early in his career at ICLARM, Pauly worked in the tropics and developed new methods for estimating fish populations. Pauly helped to design, implement, and perfect methods using length-frequency data instead of the age of fish to estimate parameters of fisheries statistics such as growth and mortality.

Later, he helped develop two major projects: ELEFAN and FishBase. ELEFAN (ELEctronic Length Frequency ANALysis) made it possible to use length-frequency data to estimate the growth and mortality of fishes. FishBase is an online encyclopedia of fish and fisheries information comprising information on more than 30,000 different species. Both projects received worldwide attention and through multiple upgrades and additions, are still prominent in fisheries biology.

Through the 1990s, Pauly's work centered on the effects of overfishing. The author of several books and more than 500 scientific papers, Pauly is a prolific writer and communicator. He developed the concept of shifting baselines in 1995 and authored the seminal paper, ***Fishing down marine food webs***, in 1998.

In 1994, Dr. Pauly became a Professor at the University of British Columbia Fisheries Centre, and was its Director from 2003 to 2008. In 1999, Daniel Pauly founded, and since leads, a large research project devoted to identifying and quantifying global fisheries trends, funded until mid-2014 mainly by the Pew Charitable Trusts and since by the Paul G. Allen Family Foundation and a number of charitable organizations, and called the **Sea Around Us** after Rachel Carson's 1951 bestselling book.

(See Page 6 for more information on FishBase.)

RECOGNIZED AS ONE OF THE FOUR GREATEST CARTOGRAPHERS Marie Tharp

Marie Tharp

Born July 1920-Aug 2006 Michigan



Marie Tharp was an American geologist and oceanographic cartographer who, in partnership with Bruce Heezen, created the first scientific map of the Atlantic Ocean floor in 1957. Tharp's work revealed the detailed topography and multi-dimensional geographical landscape of the ocean bottom. Her work also revealed the presence of a continuous rift valley along the axis of the Mid-Atlantic Ridge, causing a paradigm shift in earth science that led to acceptance of the theories of plate tectonics and continental drift.

Tharp graduated from Ohio University in 1943 with bachelor's degrees in English & Music with four minors. Due to WWII, more women were recruited in to professions like petroleum geology that had been largely restricted to men. Tharp was recruited to the U of Michigan's petroleum geology program where she completed a masters degree. Taking a job at Stanolind Oil in Oklahoma, as a junior geologist, she also found out women were not allowed to go on field trips to look for oil and gas. She was confined to the office where her duties were to collect the maps and data for the men going out in the field.

Marie left and went to work at the Lamont Geological Observatory in 1948. She initially worked with Bruce Heezen using photographic data to locate downed military aircraft from WWII. Eventually she worked for

Heezen exclusively, plotting the ocean floor. For the first 18 years of their collaboration, Heezen collected bathymetric data aboard the research ship, the Vema, while Tharp drew maps from that data, since women were still excluded from work aboard ship at that time.

In 1952, she created a total of approximately six profiles stretching west-to-east across the North Atlantic. From these profiles, she was able to examine the bathymetry of the northern sections of the Mid-Atlantic Ridge. Tharp identified an aligned, v-shaped structure running continuously through the axis of the ridge and believed that it may be a rift valley. She believed that the rift valley formed by the oceanic surface being pulled apart. Heezen was initially unconvinced as the idea would have supported continental drift, then a controversial theory. Instead, for a time, he favored the expanding Earth hypothesis, (now infamously) dismissing her explanation as "girl talk".

When Howard Foster's map of earthquake epicenters was overlain with Tharp's profile of the Mid-Atlantic Ridge it became clear that the location of these earthquakes aligned with Tharp's rift valley. It was only after seeing that the location of earthquake epicenters aligned with Tharp's rift valley that Heezen accepted her hypothesis and turned to the alternative theories of plate tectonics and continental drift. Although later recognized and attributed to for her work today on the Mid-Atlantic Ridge, it was Heezen, who at the time in 1956, put out and received credit for the discovery that was made. Tharp continued working with grad students to find the rift valley extended into the South Atlantic. She found similar valley structures in the Indian Ocean, Arabian Sea, Red Sea and Gulf of Aden, suggesting the presence of a global oceanic rift zone.

PIONEERED MARINE CONSERVATION THRU FILM MAKING Jacque Cousteau

JACQUES-YVES COUSTEAU

Born June 1910-Hybe 1997 France



Jacques-Yves Cousteau, was a French naval officer, explorer, conservationist, filmmaker, innovator, scientist, photographer, author and researcher who studied the sea and all forms of life in water. He co-developed the Aqua-Lung, pioneered marine conservation and was a member of the Académie Française.

In 1936 he was given a pair of underwater goggles, the kind used by divers. Cousteau was so impressed with what he saw beneath the sea that he immediately set about designing a device that would allow humans to breath underwater. Even during the war Cousteau turned his attention to the world below the sea. In 1942 he co-designed the Aqua-Lung, an early underwater breathing device. Cousteau then helped remove mines from French seas left over from the war. One of these minesweepers (boats used to remove mines from the bottom of the ocean) would become Cousteau's research ship, the Calypso.

On the Calypso's first research voyage to the Red Sea, the maritime and diving expertise of her crew was combined with the scientific expertise of academic scientists who came aboard. These expeditions advanced knowledge of the deep by gathering underwater flora (plants) and fauna (animals) and by extensively photographing the underwater world, which is more vast than the surface above water.

Jacques Cousteau didn't believe the rift valley really existed. So he set sail into the Atlantic with an underwater camera rig, intending to prove Marie Tharp and Bruce Heezen wrong. In his photos and videos, displayed to a large crowd at the First International Oceanographic Congress in 1959, "the great black cliffs of the rift valley, sprinkled with white glob ooze, loomed up through the blue-green water," "These images provided the world's first real look at the rift valley, and helped to convince other skeptics that it really existed supporting the theory of continental drift.

In 1960 Cousteau was an important part of the movement to prevent the dumping of French atomic waste into the Mediterranean Sea. This movement ended in success. Throughout his life Cousteau enjoyed much recognition for his tireless support of ocean ecology. It was through Cousteau's television programs, however, that his work captured the imagination of a worldwide audience. "The Undersea World of Jacques Cousteau" in 1968. The program ran for eight seasons and starred Cousteau, his sons, Philippe and Jean-Michel, and sea creatures from around the globe. In order to raise public opinion against pollution, in 1975 he founded the Cousteau Society, an international organization with branches in several countries (including the United States at Norfolk, Virginia). His grandson, Philippe Cousteau Jr in 2004 founded EartEcho International, an environmental organization that inspires young people to work towards a sustain- able planet.

COUSTEAU FAMILY LEGACY CONTINUES Fabien, Céline, Alexandra and Philippe Jr

FABIEN COUSTEAU

(Jean-Michel Cousteau's son),
an aquanaut, oceanographic
explorer, conservationist and
documentary filmmaker.

Fabien founded **The Fabien Cousteau Ocean Learning Center** in 2016 to empower local communities worldwide to champion ocean conservation in ways that are most meaningful to them.



CÉLINE COUSTEAU

(Jean-Michel Cousteau's daughter),
a documentary film director,
producer, explorer, artist, public
speaker, brand ambassador and
designer.

Céline is the Founder/Director of **CauseCentric Productions** (emphasis on short films on organizations and individuals working on environmental and socio-cultural issues. And Co-Founder/Chairman of the Board of the **Outdoor Film Fellowship**, a film fellowship program for young filmmakers to motivate change through storytelling.

ALEXANDRA COUSTEAU

(Philippe Cousteau's daughter)
an explorer, storyteller, ocean
advocate and mother.

Alexandra co-founded **EarthEcho International** with her brother Philippe Cousteau Jr. in 2000.

She started the **OCEANS 2050** initiative which is a global program of ocean afforestation - restoring lost coastal habitats.

Alexandra is deeply involved in **OCEANA's campaign to curb overfishing** in the countries that control about 1/3 of the world's wild fish catch and advocating for science based catch limits.

PHILIPPE COUSTEAU JR

(Philippe Cousteau's son)
an oceanographer and
environmental activist.



Phillippe co-founded **EarthEcho International** with his sister Alexandra and their mother. Its mission is to inspire and empower young people worldwide to act now for a sustainable future.

He has been a correspondent with Animal Planet, CNN and Living on Earth and filmed expedition specials with his wife. Since 2014, he's been host and executive producer of the syndicated kid series, **Xploration Awesome Planet**.

DANIEL PAULY DEVELOPED FISHBASE Welcome to the World of Fishes!

As of November 2018, FishBase included descriptions of 34,000 species and subspecies, 323,200 common names in almost 300 languages, 58,900 pictures, and references to 55,300 works in the scientific literature. The site has about 700,000 unique visitors per month.

FishBase is a global species database on finfishes. It is the largest and most extensively accessed online database on adult finfish on the web.

Its initial goal to provide key facts on population dynamics for 200 major commercial species has now grown to having a wide range of information on all species currently known in the world: taxonomy, biology, trophic ecology, life history, and uses, as well as historical data reaching back to 250 years.

The origins of FishBase go back to the 1970s, when the fisheries scientist Daniel Pauly found himself struggling to test a hypothesis on how the growing ability of fish was affected by the size of their gills. Hypotheses, such as this one, could be tested only if large amounts of empirical data were available. At the time, fisheries management used analytical models which required estimates for fish growth and mortality. It can be difficult for fishery scientists and managers to get the information they need on the species that concern them, because the relevant facts can be scattered across and buried in numerous journal articles, reports, newsletters and other sources. It can be particularly difficult for people in developing countries who need such information. Pauly believed that the only practical way fisheries managers could access the volume of data they needed was to assemble and consolidate all the data available in the published literature into some central and easily accessed repository. Such a database would be particularly useful if the data has also been standardised and validated. This would mean that when scientists or managers need to test a new hypothesis, the available data will already be there in a validated and accessible form, and there will be no need to create a new dataset and then have to validate it.

Pauly recruited Rainer Froese, and the beginnings of a software database along these lines was encoded in 1988. This database, initially confined to tropical fish, became the prototype for FishBase. FishBase was subsequently extended to cover all finfish, and was launched on the Web in August 1996.

OUR OWN MARINE BIOLOGY RESEARCHERS What Inspires Their Research?



DEE BOERSMA

What is your research or interest in?

Conservation Biology and Seabird Ecology with penguins as the center of interest whether in the Galápagos Islands or Argentina.

What is your favorite part of your research?

Being in the field where you can hear the earth alive with other creatures.

Who or what inspired you to do the research you do today?

I fell in love with the natural world and wanted to spend more time outside.

Do you have any advice to give a student wanting to do research?

Learn to be a good observer. Try to understand what you see and why it is happening.



JENNIFER RUESINK

What is your research or interest in?

I study the biology of mud, especially salty mud. Mud has a reputation of a shifting, unstable surface, and that's precisely why the organisms that live in or on the mud make such a difference to the structure and function of the whole system. If you have any culinary curiosity about oysters, know that they are grown on Washington mudflats and also shape the environment for other species. And you might also be surprised to learn that there are plants that flower and

pollinate underwater in the ocean: these seagrasses root in mud and shape the environment for other species.

What is your favorite part of your research?

Being outside. Testing different parts of how a complex system works. I also appreciate opportunities to talk with people who make their living on the bay. They have a strong "sense of place" and connection to the

environment, and I learn a great deal from the patterns they've seen in time and space.

Who or what inspired you to do the research you do today?

I grew up in a very landlocked state, and my first experience with the ocean was through Rachel Carson's book "The Sea Around Us." (published in 1951, it was already dated by the time I read it, but she was an inspiring communicator). Bob Paine, who coined the term "keystone predator" in ecology, was my PhD advisor and a continual prod to test ideas with an experiment.

Do you have any advice to give a student wanting to do

research? Keep in mind the vast number of entry points to research, which can be in classes, formal summer programs, internships, field schools, museums, or labs on campus. Research can involve collecting new data or working with data streams that are increasingly prevalent in biology, e.g. online genetic databases, remote sensing, public health and epidemiology. Research is often tedious and will cultivate your resilience, but always keep your eyes open for how biology can surprise you.



BILLIE SWALLA

What is your research or interest in?

I do research on the evolution and development of animal body plans. All animals start with a single cell, the fertilized egg, and develop into a living, breathing, reproducing adult. I am interested in how the fertilized egg reads out the genome over time to make an individual. The egg cytoplasm is essential to begin the gene networks that turn genes on and off in different tissues to make tissues in the right time and in the right place to create an organism. I

would like to know how these gene networks get established and how they evolve. I work primarily on invertebrates, because they frequently develop into one body plan, then go through metamorphosis to make a completely different body plan!

What is your favorite part of your research?

My favorite part of my research is embryonic development. The process of a single cell becoming an organism is fascinating! I am always happiest when there are embryos developing and we are watching them and making a developmental chart of how fast they are developing. Each process is remarkable! Cleavage is the process of the embryo making many cells as fast as DNA synthesis and cell division can occur. Then gastrulation results in cells moving and signaling to each other, making the three germ layers, a gut inside, and an ectoderm outside. Finally, a larva develops, hatches and swims away. It always seems like a miracle to me. Fertilization - Cleavage - Gastrulation - Neurulation - Hatching

Who or what inspired you to do the research you do today?

In 1983, I went to the Marine Biological Laboratory in Woods Hole, MA to take Embryology. I wanted to see ascidian embryos develop because I had read that they have beautiful colored cytoplasm. I fell in love and I never looked back. I still work on the gorgeous *Boltenia villosa* embryos that we can get readily at Friday Harbor Laboratories in San Juan Island. The myoplasm that makes the muscle is bright orange and so it is easy to see where the cells move during development. I also work on closely related tailed and tailless ascidian embryos that are found in Roscoff, France. Finally, when I convinced myself that ascidians are not representative of the chordate ancestor in the late 1990's, I began working on hemichordates as a better proxy for the chordate ancestor. We continue to work on hemichordates because they can regenerate their entire body if they are cut in half, as well as studying chordate origins.

Do you have any advice to give a student wanting to do


research? Yes, get into a lab and try it. Some students love doing research, some do not like the uncertainty. Research is all about discovering new things by trying things in a different way. Sometimes it works and sometimes it absolutely does not, but you have to enjoy the process. I love seeing new sequences or discovering new species or how they develop, it is the thrill that keeps us going as researchers. Sometimes you just have to forge ahead and learn incrementally until you finally make a breakthrough. It's not for everyone because there can be years between the exciting moments, but in my lab we celebrate everything that we can - awards, manuscripts, and grants - so there is always something to cheer. Research is a collaborative process.

TRIBETA TUTORING ONLINE FOR WINTER: Monday - Thursday: starts Mon April 5th

TriBeta Tutoring will be offered Spring Quarter online using Zoom.

Tutoring starts during the second week of the quarter on April 5th and ends the week before final exams.

Tutors will be present in Zoom, Mon-Thurs to answer your questions about BIOL 180/200/220. Zoom link and finalized schedule are on our website: <https://sites.google.com/view/uwtribeta/tutoring?authuser=0>



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!

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) 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/tutoring?authuser=0>

2020-2021 Executive Board



TriBeta Biological Honor Society

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Vice President, BILL YOUNG younbill@uw.edu
Adviser, BRIAN BUCHWITZ..... bjb@uw.edu

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.

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

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.

Be on the lookout for TriBeta virtual events for this coming quarter.

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.

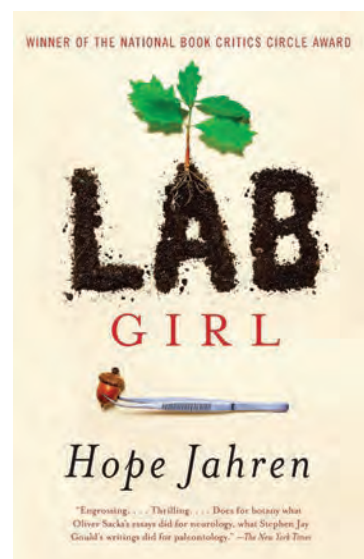
BIO BOOK CLUB: *Lab Girl* by Hope Jahren

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 **Sheryl Medrano** at smedrano@uw.edu.

Lab Girl is a book about work, love, and the mountains that can be moved when those two things come together. It is told through Jahren's remarkable stories: about her childhood in rural Minnesota with an uncompromising mother and a father who encouraged hours of play in his classroom's labs; about how she found a sanctuary in science, and learned to perform lab work done “with both the heart and the hands”; and about the inevitable disappointments, but also the triumphs and exhilarating discoveries, of scientific work.

Yet at the core of this book is the story of a relationship Jahren forged with a brilliant, wounded man named Bill, who becomes her lab partner and best friend. Their sometimes rogue adventures in science take them from the Midwest across the United States and back again, over the Atlantic to the ever-light skies of the North Pole and to tropical Hawaii, where she and her lab currently make their home.

Jahren's probing look at plants, her astonishing tenacity of spirit, and her acute insights on nature enliven every page of this extraordinary book. *Lab Girl* opens your eyes to the beautiful, sophisticated mechanisms within every leaf, blade of grass, and flower petal. Here is an eloquent demonstration of what can happen when you find the stamina, passion, and sense of sacrifice needed to make a life out of what you truly love, as you discover along the way the person you were meant to be.



Winner of the National Book Critics Circle Award for Autobiography, A New York Times 2016 Notable Book, National Best Seller, Named one of TIME magazine's “100 Most Influential People”, An Amazon Top 20 Best Book of 2016, A Washington Post Best Memoir of 2016, A TIME and Entertainment Weekly Best Book of 2016.

BIOLOGY GREENHOUSE STAFF IN REDMOND Favorite Pollinators Picks



Paul holding a *Lachenalia purpureocaulis*.

Paul Beeman, Plant Technician for over 20 years
B.S. Entomology, M.S. Plant Molecular Biology, PhD. Soil Chemistry

The flowers of a number of South African bulbs are pollinated by small rodents. The best studied are members of the genus *Massonia*, which are pollinated by gerbils. The flowers of these plants are often clustered together with both the stamens and pistils extending beyond the petals, giving them a powder puff look. As the animal searches for pollen or nectar they get their face and paws covered in pollen, some of which is transferred to the next flower they investigate. This accidentally happened in my home. When it opens, I put my white flowered *Haemanthus albiflos* into our bay window to show it off. It is also where our cat likes to survey the outdoors. His pacing around in the window brushed against the flowers, resulting in over 30 berries on the plant which rarely has even a single berry! The purple flowered *Lachenalia purpureocaulis* shows the puffy flower head shape that is conducive to this type of pollination.

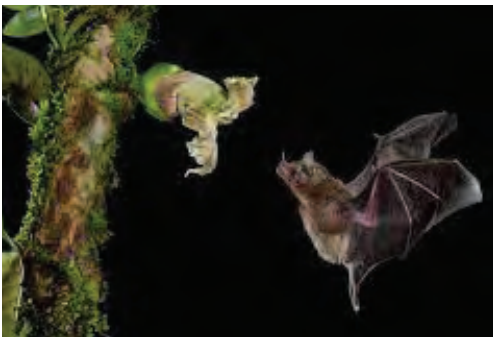


Pollen covered *Gerbillus paebe* getting nectar from *Leucospermum arenarium* flower.

Nile Kurashige-- Plant Technician II

My greenhouse career started as a student hourly in the Arthur Ross Greenhouse at Barnard College while getting my BA, then I obtained my master's degree in Botany at University of Toronto conducting experiments in the rooftop greenhouses. My first job out of school was in the Victorian greenhouses at Volunteer Park Conservatory where I worked for nine years. In 2013, I was lucky enough to start working at UW Biology Greenhouse. What keeps me interested in plants is the abundance of diversity of the plant kingdom in every way imaginable. I've learned enough to never make generalizations because there are always crazy exceptions.

When I see a bat pollinated flower, I like to imagine how the bat pollinates it. Bats, those I have seen, are not graceful flyers. To me, the way they fly looks like they learned to fly five



Bat flying to a *Crescentia cujete* flower.

minutes ago. When you compare bats to animals that fly intentionally and precisely like a hummingbird it is like comparing a toddler just starting to ride a bike for the first time to a competitor riding on Tour de France; or a fluttering cabbage white butterfly in the field of blooming mustard plants with a monarch on a migration path or even a hawk moth approaching a flower with a very long nectar spur with amazing precision. When visiting a flower, some bats go after pollen (e.g. bat pollinated cacti often have lots of pollen at the front of the flowers) and other bats love nectar (e.g. bat pollinated agaves produce copious amounts of nectar). Either case, with such erratic patterns of flying, they bump into the flowers getting covered in pollen then depositing it to subsequent flowers thus pollinating the flowers. Flowers that co-evolved to be pollinated by bats have to accommodate for how the bats fly by being tough, robust flowers that can withstand the bats bumping into the flowers. Bats are also unique pollinators because they use echolocation to find flowers. Some plants have adapted to that too and have hairs around the flowers to make the echo of the surrounding area quiet to amplify the echo of the flower itself. I hope next time you see a bat pollinated flower, characterized by sturdy construction with echolocatability as well as often light, greenish color flowers and overripe fruit scent, you can imagine a bat trying to get the nectar out the best it can while flying like a toddler trying to bike for the first time.



Nile standing next to a flower coming out of the trunk of *Crescentia cujete* (commonly known as the Calabash tree)

BIOLOGY GREENHOUSE STAFF IN REDMOND Favorite Pollinators Picks



Melissa "buzz pollinating" a very small flower (she is holding with her right hand with a tuning fork in her left) of this *Solanum* genus.

Melissa Lacey, Greenhouse Technician

I earned my BA in Botany and Environmental Sciences at Connecticut College. After working on various small vegetable farms, I joined the Biology department as a graduate student in Liz Van Volkenburgh's plant physiology lab where I completed my PhD in 2019.

Bees are deft pollinators, responsible for pollinating and creating fruit for many of the plants we eat. One highly specialized way they use their bee-skills is by sonication, or 'buzz pollination'. Here, instead of simply brushing against the anthers and collecting pollen all over their fuzzy bodies, the pollen of these flowers is packed very tight inside tubular anthers and is only released due to the force of the specific vibrations caused from sonicating bees. We all know the 'buzzzz' sound! The pollen can now land on the stigma of the same flower, or, sticking to the bee's hairs can contact the stigma of the next flower the bee visits. In this relationship the flower is able to either self or outcross its genetic material, and the bee can eat some of the protein-rich pollen.



Bumble Bee "buzz pollinating" tomato blossoms.

Many examples of buzz-pollinated flowers are in the *Solanum* genus which includes tomatoes, potatoes, and eggplant. Several *Vaccinium* species are also buzz pollinated including the delicious North American blueberry. You can even mimic the bees in your own backyard using a middle C tuning fork--Happy pollinating!

WHO CAN BE A POLLINATOR? More Than You Think (From the UCONN Plant Biodiversity Conservatory)

WIND POLLINATION (anemophily) Flowers may be small and inconspicuous, green and not showy. They produce enormous amounts of tiny pollen grains and they have large feathery stigmas to catch the pollen grains.

WATER POLLINATION (hydrophily) Water-pollinated plants are aquatic. Their flowers tend to be small and inconspicuous with lots of pollen grains and large, feathery stigmas to catch the pollen. Many aquatic plants are insect-pollinated, with flowers that emerge into the air.

BEE POLLINATION (melittophily) Bee-pollinated flowers tend to fall into two classes: 1) Showy, open, bowl-shaped flowers that are relatively unspecialized (e.g. wild roses, sunflowers) 2) Showy, complicated, non-radially symmetric flowers that are more specialized (e.g. peas, fox-gloves). Some bee flowers tend to be yellow or blue, often with ultraviolet nectar guides and scent. Nectar, pollen, or both are offered as rewards.

BUTTERFLY POLLINATION (psychophily) Butterfly-pollinated flowers tend to be large and showy, pink or lavender in colour, frequently have a landing area, and are usually scented. Since butterflies do not digest pollen (with one exception), more nectar is offered than pollen.

MOTH POLLINATION (phalaenophily) Hawk moths (Sphingidae) behaviour is similar to hummingbirds: they hover in front of flowers with rapid wingbeats. Most are nocturnal or crepuscular. So moth-pollinated flowers tend to be white, night-opening, large and showy with tubular corollas and a strong, sweet scent produced in the evening, night or early morning.

FLY POLLINATION (myophily & sapromyophily) Myophiles: Wide diversity of flies (particularly bee flies (Bombyliidae), hover flies (Syrphidae), etc.) feed on nectar and pollen as adults, and regularly visit flowers. Sapromyophiles: normally visit dead animals or dung. They are attracted to flowers that mimic these odoriferous items! These plants have a strong, unpleasant odor, and are brown or orange in color.

BIRD POLLINATION (ornithophily) Nectar-feeding birds: hummingbirds, sunbirds, honeyeaters, flowerpeckers, honeycreepers, bananaquits, flowerpiercers and lorikeets. Hummingbirds can hover in front of flowers, while the perching birds need substantial landing platforms.

BAT POLLINATION (chiropterophily) Bat-pollinated flowers tend to: be large and showy, white or light coloured, open at night and have strong odors. They are often large and bell-shaped. Bats drink the nectar, and these plants typically offer nectar for extended periods of time.

NON-FLYING RODENT POLLINATION (therophily) The first group consists of low growing plants visited by ground-dwelling rodents and are characterized by flowers packed tightly into geoflorous and cryptic inflorescences, nocturnal anthesis and production of copious amounts of sugar-rich nectar and pollen as well as a musky odour. The second group is a number of climbing marsupials (honey possums, & sugar gliders).

BEETLE POLLINATION (cantharophily) Most beetle-pollinated flowers are flattened or dish shaped, with pollen easily accessible, although they may include traps to keep the beetle longer. Beetle-pollinated flowers are usually large, greenish or off-white in color and heavily scented.

WHAT TO EXPECT IF YOU DO HAVE AN IN-PERSON CLASS

If you are in one of the three classes for Biology that have in-person labs, there are Covid-19 protocols for each building and lab. Always keep a 6-foot distance from others and wear a mask at all times.

- **Your instructor has emailed lab protocols and class room assignments, please read them thoroughly.**
- We encourage you to read the Biology Covid-19 Prevention Plan, in particular the Common Spaces Guidelines. There are signs posted through all the buildings to assist you.
- **Masks / Face coverings for both buildings that meet the following SEVEN required conditions:**
Fit snugly against the sides of the face; completely cover the nose and mouth; be secured with ties, ear loops, elastic bands, or other equally effective method; include at least one layer of cloth, although multiple layers are strongly recommended; allow for breathing without restriction; be capable of being laundered and machine dried without damage or change to shape; and be free of holes, tears or VALVES that have the potential to release respiratory droplets.
- Lounging areas in Hitchcock are limited or closed, do not use furniture that is taped off or lounge areas that are or are at maximum safe social distancing occupancy. All tables have an occupancy limit of 1.

HITCHCOCK HALL (HCK)

BIOL 440 General Mycology (HCK 444)

BIOL 446 & 546 Plant Classification & Identification
(HCK243/247/244/246)



Main outside east doors of Hitchcock Floors 1, 2 & 3 will be unlocked on a limited basis for these classes for security.

BURKE MUSEUM

BIOL 433 Marine Ecology (Burke 203P)



Your instructor will confirm building access protocol depending on whether the museum is open to visitors.

HERE ARE SOME OF THE BUILDING PROTOCOLS

- Facial coverings to meet **SEVEN** required conditions above.
- Keep a 6-foot distance from others at all times.
- Restrooms are **ONLY ONE** person at a time
 - Leave main door propped open
 - If it is full, wait in the main corridor not the small hallway
 - Wash hands after using restroom
 - Wear mask
- Entire hallways are **ONE** person at a time.
 - Look before you walk
 - Wait for others to finish their journey
 - (Step aside into door ways if you need to let someone by to maintain a 6-foot distance)
- Enclosed stairways in HCK are all one-way
- The open staircases is only one person at a time.
- Elevators are **ONLY ONE** person at a time.
 - Take the stairs or wait for the next elevator
 - Priority for those with mobility needs, carts or heavy objects
 - Stand at least 6-feet from elevator doors.
 - Wash or sanitize hands after leaving the elevator
 - Wear mask
- Drinking fountains usage: Please fill water bottles only
- While waiting to get into your class room. Wait 6-feet apart.

HERE ARE SOME OF THE BUILDING PROTOCOLS

- Facial covering to be worn in the building at all times.
- Facial coverings to meet **SEVEN** required conditions above
- Practice a strict 6-foot distance from others at all times.
- Class room seating placed at least six feet apart
- Occupants must abide by directional flow and maximum occupancy signage (elevators and staff stairways)
 - Small elevators are two people at a time, freight elevator is four
 - No directional restrictions for the public grand staircases
- Multi-stall restrooms capacity may not exceed the number of stalls
 - Wash hands thoroughly for 20 seconds when using restrooms
- Many hand sanitizer dispensers are available in public places and classrooms, occupants encouraged to use often
- Classroom tables / workstations should be wiped down with disinfectant spray / wipes at the end of each use
- Instructor should provide separate instructions for cleaning / disinfecting any class room materials (if applicable should collections be involved)
- Per UW EH&S, no restrictions on using water fountains, though occupants may wish to utilize their own water bottles while onsite

BIO 497 UNCOMMON LEADERS Women & Minority Role Models



Billie Swalla is teaching the Spring quarter class: Bio 497 Uncommon Leaders.

The class will examine the contributions of women and minorities as leaders and creators in Biology. Those people who have transformed our discipline through a variety of avenues ranging from scientific contributions, to economic, social and political domains.

Why is there a need for a class like Bio 497 Uncommon Leaders?

It is important for students to realize that those scientists that really think "out of the box" many times don't get credit because science is very conservative. If there is a group working together, it is usually the person of most privilege that gets credit (White males, wealthy, most prestigious schools).

How did you pick the people you highlighted in class?

I let the students pick someone who inspires them. In the past, students have picked well known scientists Dr. Mary Claire King (UW), Dr. Lynn Margulis (U Mass), and Dr. Geerat Vermeij (U.C. Davis).

What is the goal of Bio 497?

It is to pick someone who inspires them and over came the odds to be a scientist. This year we will be making Wikipedia pages, so we'll concentrate those who do not have Wikipedia pages.

Why is it good to have role models who look just like you?

It is helpful for students to see someone who looks like them and relates like them to see themselves as scientists. I had children as a graduate student and all of the Developmental Biology faculty at the University of Iowa were white males and I know that they did not relate to someone who was a single parent. I had many people tell me that they could not take me seriously because I had children (!). Later, at UW a colleague told me that I didn't "count" as a faculty who had children because my boys were older. It is exhausting to be put in all kinds of boxes and have your commitment to science questioned because of your personal life. Men do not usually undergo this kind of scrutiny of their life choices.

Knowing that most textbooks in education are written by white men who determine content and leave out women and minorities, does the internet and classes like yours help students see more relatable possibilities for themselves?

When I am teaching, I add those in who are left out. A figure of Watson and Crick will always have a photo of Rosalind Franklin with it. Darwin and Wallace are both shown in my courses. Joan Ruderman discovered cyclins first in clams, but she did not receive a Nobel Prize because Tim Hunt saw her work at MBL and then found cyclins in sea urchin embryos. Women and Black, Indigenous, People Of Color in science are less visible on the internet, so sometimes we have to hunt a little. The last time I gave the course we were searching for Black Evolutionary Biologists for one of the students. We could only find three then. He said "Oh, I guess this is the point of the course?" and I said, "Yes, we're going to get you graduated and then there will be four." I know more now because of BEACON with Michigan State, but it can seem daunting.

Did the students you had before, tell you seeing other people like themselves highlighted in your class helped to inspire them in their careers? Or perhaps contacted you later to tell you learning about Uncommon Leaders inspired them to help others too.

That is interesting, I still am in contact with most of the students from the course and they are all involved in Diversity, Equity and Inclusion efforts in their prospective positions. It's a bit of a chicken and egg problem - Did they take the course because they were already interested in these issues or did the course educate them about the importance of keeping these issues front and center?

Does it help to join an all-minority or all-women organizations? Is there support from those?

Yes, I know that SACNAS here on the UW campus allows students to meet other diverse students and form a community. They are very active and supportive of all students! I love ADVANCE, here on the Seattle campus because it has allowed me to meet female faculty from across campus. We have similar issues and it is helpful sometimes to get an outside perspective on a departmental issue.

What do you get out of teaching a class like this? Was it inspiring or just made you happy?

I always enjoy hearing these inspiring stories and there is a lot of science involved. What new ideas did this person have? Why were people skeptical of their ideas? What kind of data was convincing about their work? Teaching is about showing students how to make these discoveries themselves. Frequently the data is there, but scientists are biased by their past experiences and can't believe the results.

DEPARTMENT WINTER AWARDS

Undergraduate Student Awards

BEACON Lab Research Award
Caroline Rawls
Shawn DeCew BEACON Field Award
Macie Taylor
Katharina Casey Leadership Award
August (Jiatai) Liu
Excellence in Biology Scholarship
Marcus Chu, Taylor Gomban, Bill He, Gabriel Ludlum, Bill Young
Donald S. Farner Scholarship
Cali Lescas Hernandez
John & Dorothy Franco Award
Tai Nguyen
Friday Harbor Labs Award
Emily Duque Gallagher, Neva Hahn
Frye-Hotson-Rigg Award
Jonah Chu, Ava Kloss-Schmidt, Macie Taylor
Ingrith Deyrup-Olsen Peer Facilitator Award
Isobel Ladenburg
Dr Donald Kelts Family Scholarship
Nahom Daniel
Amalia & Craig Magaret Award
Hunter Furutani
May Garrett Hayes Scholarship
Anthony Garcia
Porath-Johnson Scholarship
Taylor Irwin, Pittra Jaengprajak, Haley Leeper, Sophie Tajadod
Walter & Margaret Sargent Award
Ariana Ferrell, Bryce Kan
Varanasi Scholarship
Leonel Flores

DEPARTMENT WINTER AWARDS

Graduate & Postdoc Awards

BEACON Award
Kayla Hall
Botanical Field Research (Giles) Award
Simra Zahid
Robert T Paine Exp & Field Ecology Award
Aji John
Friday Harbor Labs Award
Kindall Murie
Robin M Harris Award
Amy Platenkamp
Heerensperger Award
Natalia Guayazan Palacios
Hoag Award
Kayla Hall, Kindall Murie
Kruckeberg-Walker Award
Simra Zahid
Orlans Award for Tropical Studies
Alyssa Sargent
Orlans Award
Alicia Rice
Luvu Award
Alicia Rice
Riddiford-Truman Award
Jeremy Chan, John Litie
Walter & Margaret Sargent Award
Natalia Guayazan Palacios
Walker Family Award
Robin Fales
Robert T Paine Exp & Field Eco Fellowship
Robin Fales
WRF-Hall Fellowship
Elliott Smith, Elena Stiles
Hall International Fellowship
Simra Zahid
Mary Race Bevis Postdoc Research Award
Simon Snoeck
Luvu Postdoctoral Award
Chris Law

NEW 4-STORY HEALTH SCIENCES EDUCATION BUILDING East of Hitchcock



Photo was taken by Jason Patterson in March 2021 before Spring quarter started.

PROGRESS OF THE CONSTRUCTION. NOW GOING FASTER.

It will become a new student hub for the Health Science schools of Dentistry, Medicine, Nursing, Pharmacy, Public Health and Social Work with classrooms, study areas, library & a new anatomy lab.



Photo was taken by Ron Killman the end of September 2020 before Autumn quarter started.



Photo was taken by Jason Patterson the end of December 2020 before Winter quarter started.