

BIOLOGY STUDENT
NEWSLETTER

W

AUTUMN 2022

ISSUE 41

IMPORTANT DATES
FOR AUTUMN QUARTER

Sept 28	First Day of Instruction
Oct 4	Last day to drop a class without a fee thru MyUW
Oct 5	All courses require entry codes to add and fee
Oct 7	Last Day to apply to Biology major in Autumn
Oct 11	Last Day to drop a class without the use of Current Qtr Drop & \$20 fee
Oct 18	Last Day to add a class through MyUW
Oct 29	Dr Millie Russell Day
Nov 2	Last Day to Apply for Grad Reg Priority GSP for Winter
Nov 4-20	Win Reg Priority Period 1
Nov 11	Veterans Day Holiday
Nov 21-Jan 2	Winter Reg Period 2
Nov 24-25	Thanksgiving & Day After
Dec 9	Last Day to Withdrawl (from all Aut Qtr classes)
Dec 9	Last Day to use Late Course Drop Period
Dec 12-16	Final Examination week
Dec 16	Last Day to convert to S/NS
Dec 19-Jan 2	Winter Break
Jan 3	Winter Quarter Starts

A MESSAGE FROM THE CHAIR OF THE DEPARTMENT



David Perkel, Chair of Biology

Dear UW Biology Undergraduates and Graduates,

Welcome to a new academic year! Hopefully you all, whether you are returning or are new to the department, had a fun and recharging summer. We are thrilled to have you join us.

As we begin the quarter, I'm feeling a lot of excitement in the air. More people are on campus, interacting more easily and spontaneously. Cafes are filled and hallway conversations are taking place more frequently than we've seen since Feb. 2020. It's buzzing with energy and I'm sure all of us are enjoying it.

While COVID and monkeypox remain active, you as Biology majors understand the science behind these diseases and the ways in which vaccines, masking and other important public health measures can improve and save lives all around us.

Many of you are seeing some of your instructors in person for the first time. Two of our newest faculty members, Matt Akamatsu and Yan Wang will be teaching their first courses this year, and many of you may be having your first fully in-person course experiences. Such activities can add anxiety and yet, engaging with material is by far the best way to learn about how the natural world works. And if you want a chance to relax and "naturebathe" right here on campus, we will be having open hours at our Greenhouse on the south side of the Life Sciences Building, right along the Burke-Gilman Trail. That will be increasingly inviting as the weather turns colder and wetter. Keep your eyes out for the announcement of our Greenhouse's public hours.

Exciting research continues in the department and many of our Biology majors take part. Briana Abrahms' group has published new research about how top predator species can trap themselves as they adapt to climate change. Alejandro Rico-Guevara's group published work on why 1 in 5 female Jacobin hummingbirds have male-like plumage. If you are interested in getting involved in learning new things about the natural world, I encourage you to visit the Biology website, contact a professor or TA, and take the plunge!

And Biology members continue to receive well-earned honors, and we mention a few of them here. Prof. Emeritus Jim Truman was elected to the National Academy of Sciences. Affiliate Professor Sue Moore was appointed by President Biden to serve as a Commissioner on the U.S. Marine Mammal Commission. Prof. Adam Leaché was awarded the UW Distinguished Teaching Award. Assoc. Teaching Professor Jon Herron won the Honors Excellence in Teaching Award – for the 5th time! Prof. Billie Swalla won the Service Award from the Pan American Society for Evolutionary Developmental Biology. Congratulations to these Biology members and others for these accolades.

Despite all of that change, our core missions as part of a public university remain entire unchanged: discovering new knowledge about life on earth; transmitting and sharing that knowledge with our students; helping the next generation of biologists gain research experience and professional skills; and inform the community about the living systems around them, ranging in scale from molecules to ecosystems. We are all working together. The UW Biology community inspires me on a daily basis. I hope the new academic year is off to a great start for all of us.

Best wishes, David Perkel, Professor and Chair, Department of Biology



FOUR ROOMS YOU CAN VISIT IN THE GREENHOUSE Public Opening Coming Soon!

Katie Sadler is our Greenhouse Manager. Our main greenhouse crew is Paul Beeman, Nile Kurashige, Melissa Lacey, Katie Ruesink & Truman Ricks who water and care for the plants seven days a week. Docents and volunteers are being trained right now.

When the Biology Greenhouse opens, visitors will only be able to visit the four rooms that contain the Teaching Collection. GH1 Desert, GH6 Warm Tropics, GH8 Cool Tropics and GH9 Tree of Life. The other rooms will be marked for research and entrance is not allowed.



Greenhouse Room 1 Desert Room



Greenhouse Room 6 Warm Tropics Room



Greenhouse Room 8 Cool Tropics Room



Greenhouse Room 9 Tree of Life

IN HONOR OF THE GREENHOUSE OPENING All Things Plants in Dept of Biology



Greenhouse Education Area

With the anticipated official opening of the Greenhouse to the public, this autumn issue is focusing on all things plants in the Biology Department. In June of this year, some of our long standing plant organismal faculty retired and the current plant research trend is gearing towards a more cellular and physiologic focus. However, we do have a great organismal class taught by teaching faculty Dr Audrey Ragsac in the spring and summer of 2023: Plant Identification and Classification (Bio446/546).

The articles will start with Dr Ragsac, and moves on to Biology's plant based research faculty and then highlight four renowned women scientists in the World of Botany.

There is a special feature called, Who is Your Dream Pollinator?

Dr Paul Beeman (who works in the Greenhouse) has a newly created feature called "Paul's Peculiar Plant Picks" presenting a plant that is a must see on your next visit to the Greenhouse.

And yes, Book Club will have a great plant book to read this quarter.

PLANT IDENTIFICATION AND CLASSIFICATION CLASS Coming Spring and Summer



AUDREY RAGSAC

Plant Identification and Classification (BIOL 446/546), As a student in this class, you will take a 10-week trip through millions of years of land plant evolution, learning to identify our native conifers and up to 41 native Washington plant families along the way. During lecture, you will be introduced to key features of each group and learn tips for identification, examining live specimens during labs that follow. The Flora of the Pacific Northwest will be your guide to mastering plant morphology and using those skills to identify unknown plants to species. You will have the opportunity to ask your own questions about plants in an individual project and see these plants in nature by attending a guided weekend field trip. You will use your honed skills to pursue additional opportunities in botany, impress your friends during hikes, and strengthen your connection to the natural world.

1) What is your research or interest in?

My interest in plants began as an undergraduate student at UC Berkeley. Their course offerings in natural history opened my eyes to the patterns of biodiversity in our world and the millions of years of evolution required to achieve them. For my doctoral work with Richard Olmstead here in the Biology Department, I explored the systematics and biogeography of three lineages in the plant family Bignoniaceae. My goals were to uncover the evolutionary relationships of these understudied groups and use those relationships to assign taxonomic names to species, as well as look for morphological and biogeographic trends in their evolution. In teaching, my main goal is to help students see how mind-blowing evolution and biodiversity are and that understanding these patterns will help them see the living world in a new and empowering way.

2) What is your favorite part of your research

Feeling like a little kid again. Reading the words of storied researchers like Gentry, Simpson, Darwin, even Linnaeus, and then following in their footsteps makes my work feel timeless. Even though I look and have led a completely different life from those people, I am energized to continue their legacies in my own way. Taking a part of nature that was not well understood and being the person to shed light on it feels like a superpower, and I feel fulfilled knowing that I made a difference.

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

It may sound surprising, but I took a break from research following my Ph.D. defense in 2019. While I felt proud of my research, I was incredibly burnt out. I pivoted to teaching full time, a role I enjoyed holding as a graduate student. Helping students achieve their dreams is an amazing feeling and sharing their success feeds my soul. As a teaching associate, I work with the BIOL 180 teaching team to prepare budding biologists for their college and career journeys. I teach BIOL 446/546 in the spring and summer. To keep things fresh, I also teach an Honors course on infectious diseases. I am looking forward to developing more courses for the Biology Department in the future, as well as embarking on new research endeavors focusing on the flora of the Pacific Northwest.

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

Take advantage of all the opportunities that come your way – you never know where they will lead. Don't be afraid to talk with your TAs and professors. Remember, we are here to support you and enable your dreams!

OUR OWN PLANT BIOLOGY RESEARCHERS What is Their Plant Research?



BERRY BROSI



Ecological Networks

Dr Berry Brosi's website
<https://www.brosilab.org>

Teaching: Bio 472/476

What is your research or interest in?

I am interested in how diverse multi-species communities are formed, how they maintain their diversity, and how they function. In particular, many of the questions my lab is asking currently are about ecological networks—what are the patterns of connections among species in terms of their ecological interactions? And how does that interaction network structure affect ecosystem stability and functioning? We primarily use plant-pollinator networks as a model system to ask these questions. We take a multi-faceted approach to answering biological questions and we have done work in the field (recently, primarily in the Colorado Rockies, though we're looking to expand to some local Washington field sites too), in the lab (with both molecular tools and also behavioral assays), and with mathematical models, and we may expand to greenhouse studies as well.

What is your favorite part of your research?

I enjoy almost every part of actually doing research. My favorite part is doing field work and being immersed in nature, which is ultimately what we want to understand. But I also really love mentoring students in research, and I also love doing the statistics at the end, which is where we actually get the answers to our questions!

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

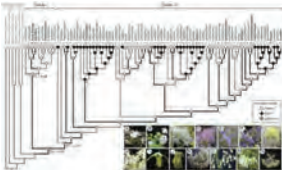
Many different people and experiences conspired to get me interested in research, but one of the most influential in terms of pursuing research was my undergraduate research advisor. She made a huge impression on me and got me interested in thinking about big-picture questions in biology. My PhD and post-doc advisor was also highly influential in the work I do now, even though my current research is pretty different than what she does.

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

Be curious! Work on questions you are excited about. Don't let the little failures and let-downs get to you—they are part of the process. And celebrate the little victories and successes! Work with advisors who are kind and encouraging.



VERONICA DI STILIO



Phylogenetic framework for the plant genus Thalictrum with ancestral character state reconstruction of pollination mode.

Dr Di Stilio's website
<http://faculty.washington.edu/distilio/>

Teaching: Bio 441, 489/590

What is your research or interest in?

I work in plant evo-devo investigating the genetic basis of plant adaptations, reproductive features in particular. Often, a given gene or gene family may be involved in a critical process, like flowering, in a certain group of plants (like flowering plants). And yet a comparable gene can be found in a very different type of plant that does not produce flowers (like a moss, or a fern), where it does something different. I am interested in that trajectory of genes being repurposed into different functions throughout evolution, and in the associated comparative morphology and development.

What is your favorite part of your research?

Looking together at cool results brought by students and staff in my group, the beautiful microscopy image that says it better than 1000 words, the public defense of a PhD student in the group, the occasional field work opportunity, learning that one of our manuscripts has been published, or a grant awarded.

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

It was a long windy path to the research I do today, dotted by wonderful mentors and great opportunities that I am very grateful for. Specifically for evo-devo it may have been the ABC model of flower development. Ultimately it has been curiosity, Nature, and thinking holistically about how the different types of plants came to be.

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

Follow your intuition and what makes you feel fulfilled (with a pinch of pragmatism), there are plenty of examples of very successful scientists studying quirky, unlikely things. Don't get bogged down in statistics about the different career paths, built your own.

OUR OWN PLANT BIOLOGY RESEARCHERS What Inspires Them?



TAKATO IMAIZUMI



Dr Imaizumi's website

<http://faculty.washington.edu/takato/>

Teaching: Bio 416/302

What is your research or interest in?

I am interested in how organisms respond to surrounding environments. We investigate how plants control their developmental programs, such as flowering, in response to daily and seasonal changes. Since plants and animals live in daily and seasonally altering environments, their responses are influenced by the circadian clock. It is fascinating to learn how gene and protein networks function as circadian oscillators and seasonal calendars inside the tissues and cells.

What is your favorite part of your research

It is so exciting to hear new results from my lab members. If the results fit our hypotheses, we feel satisfied and rewarded. Even if they don't, developing an alternative hypothesis is stimulating. When I did experiments by myself, I was the first to learn new results. Now I eagerly await my lab members to show me their exciting findings.

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

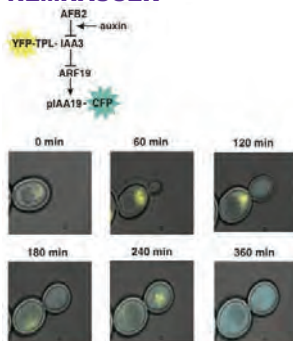
There are many people and circumstances that helped me to be who I am right now. Since I came to UW Biology, our lab has had a weekly joint lab meeting with Jennifer Nemhauser's lab. Having a joint lab meeting with Jennifer and her lab members has been wonderful for my lab and me. I sincerely appreciate them. Recently, our joint lab meeting became even bigger with Adam Steinbrenner's lab and Verónica Di Stilio's lab, which is very stimulating. I feel we form a large supportive plant group on the LSB 5th floor.

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

Please find what you are interested in and why you care about it. Developing your ownership of your project is important. Also, please think about the impact of your work on other people.



JENNIFER NEMHAUSER



Synthetic auxin-induced transcription in yeast.

Dr Nemhauser's website

<http://depts.washington.edu/nemlab/>

Teaching: Bio 200

What is your research or interest in?

I love thinking about the hidden world of biological molecules, and the ways that they are connected to one another. This biological internet makes it possible for a plant to compute exactly how much energy it can harvest given current weather conditions, and how much of that energy it should commit to making more leaves versus more roots. In my group, we try to map these biological information-processing networks, and how we might be able to tweak them to help plants survive environmental stresses like drought or a late frost or flooding.

What is your favorite part of your research?

The most amazing part of a life in research is the opportunity to meet and work and learn with an incredible diversity of people—each with their own unique life story that has brought them to science. The moments of synergy, when a new understanding about the natural world comes about through talking and thinking with someone else, are an indescribable joy and an incredible privilege. One of the best (and often hardest) parts of being a faculty member is working to reduce institutional barriers that restrict who gets to experience these joyous and privileged moments.

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

My grandfather was an avid gardener, and I spent many hours with him in the very large garden he tended for over 70 years. Of the many things I learned from him, perhaps the most dear to me is that every decision you make in life is an opportunity to do good. In all he did, he was guided by genuine curiosity, deep respect for others (plants or people) and humility—particularly when it comes to gophers. Every morning when I read the news, I can't help but wish that all of us could find a way to bring those qualities into our work at UW Biology, and into the larger world.

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

I teach introductory biology, and my advice to my students is always the same: Find a lab where everyone is treated with respect, and where people's actions show that they are invested in each other's success. Find a place to learn where people are thinking deeply about equity and ethics, because these qualities are as much a part of great science as any technique or technology.

OUR OWN PLANT BIOLOGY RESEARCHERS What Advice do They have?



**ADAM
STEINBRENNER**



Immune Recognition in Plants

Dr Steinbrenner's website
<https://steinbrennerlab.org>

Teaching: Bio 426

What is your research or interest in?

I am interested in why plants are either resistant or susceptible to pests and pathogens. This often comes down to differences in their immune systems -- some plants can successfully detect attackers and induce defense responses, but others cannot. We use genetics, genomics, and synthetic approaches to understand the molecular processes underlying plant immunity, especially the receptor proteins that allow plants to first recognize attack. We hope this research will ultimately allow engineering of plant immune signaling and durable pest resistance in crop plants.

What is your favorite part of your research?

Designing new projects and experiments is really fun, especially if it is a joint process with scientists in my lab or with collaborators. I also love unexpected findings or insights that take us in new directions. We work with model plant systems that allow us to rapidly test hypotheses in the lab, and so every week feels different and exciting.

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

I always loved plants from hobbies involving gardening, trees, and nature -- but my academic interests were always geared toward molecular biology. As a first year undergrad I had no idea that whole research labs were focused on studying the molecular biology of plants! (I also learned early on that I did not like working with mice.) I credit several great instructors who helped point me toward lab experiences I really loved.

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

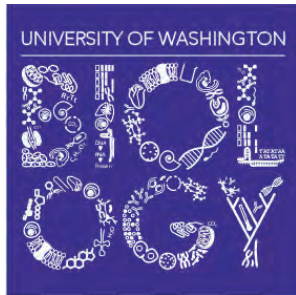
Start asking about opportunities as early as possible, and don't be afraid to shift labs to try different topics. I also recommend looking into summer internship opportunities as early as possible, such as "Research Experiences for Undergraduates" (REU) programs at UW and elsewhere. Many of these are funded by the NSF and provide a full summer stipend. Google "NSF REU sites" for more info!

TRIBETA T-SHIRT DESIGN CONTEST Winner will get their T-shirt for free!


The Biology Honor Society (TRIBETAS) is having a T-Shirt Design Contest. The winning design will go on sweatshirts, t-shirts and other items. The funds raised from sale of apparel will fund activities and events to promote student community in the Department of Biology for this school year. The winner of the T-shirt design contest will get their T-shirt for free!

Email miraroth@uw.edu with any questions.

Samples of popular past shirt designs:



YOUR DESIGN MUST MEET THE FOLLOWING SPECIFICATIONS:

- One color
 - Approximately 8 x 8 or 10 x 10 (max)
 - No heavy and large coverage of solid blocks of color
 - Submit as a PDF at 300dpi (at size)
 - Design must be clean (if messy with speckles, the silkscreeners will not clean it up)
 - Design must say “University of Washington Biology” or “UW Biology,”
 - Be related to Biology
 - Deadline Nov 2 @ 11:59 pm
- 



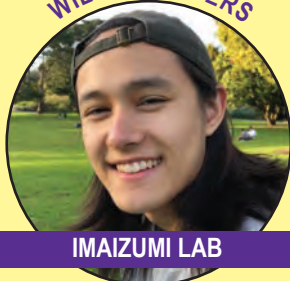
**YOU WILL NEED TO DOWNLOAD
TO THIS SITE:**

<https://forms.office.com/r/0PpYquy83j> [forms.office.com]

DEADLINE FOR SUBMISSION IS WED NOV 2 @ 11:59 pm.

WELCOME! WELCOME! Thirteen New Graduate Students with their Labs

WILLIAM ALBERS



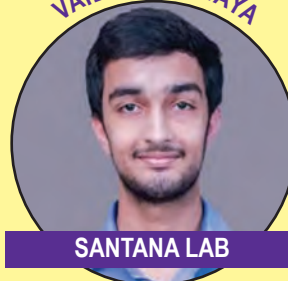
IMAIZUMI LAB

ANNA BRANT



SIDOR LAB

VAIBHAV CHHAYA



SANTANA LAB

ANNIE COLGAN



BROSI & THEOBALD LAB

ELIZABETH DUAN



KERR LAB

MAGGIE FUQUA



AKAMATSU & PARADEZ

ANTHONY GARCIA



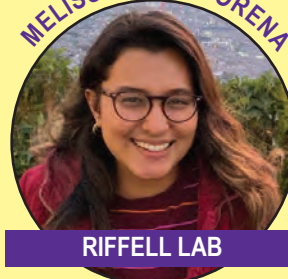
STEINBRENNER LAB

HEON SU KIM



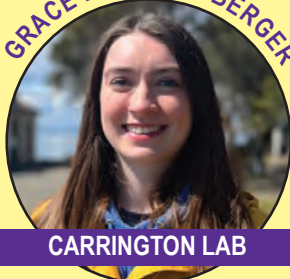
AKAMATSU LAB

MELISSA LEON NORENA



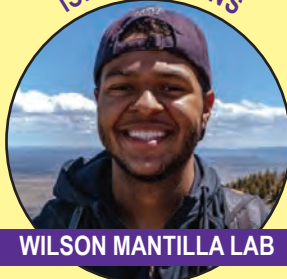
RIFFELL LAB

GRACE LEUCHTENBERGER



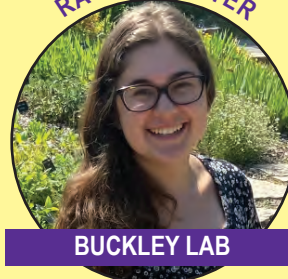
CARRINGTON LAB

ISIAH NEWBINS



WILSON MANTILLA LAB

RACHEL POTTER



BUCKLEY LAB

ABHISHEK RAGHUNATHAN



AKAMATSU LAB

2022

DRAWING ON BOTH INDIGENOUS & SCIENTIFIC KNOWLEDGE Robin Wall Kimmerer

ROBIN KIMMERER

Born 1953 Upstate New York



Kimmerer is a Distinguished Teaching Professor at the Environmental and Forest Biology Department at State University of New York College of Environmental Science & Forestry (SUNY ESF). She teaches the following courses on Land and Culture, Traditional Ecological Knowledge, Ethnobotany, Ecology of Mosses, Disturbance Ecology, and General Botany. She is the director of the **Center for Native Peoples and the Environment** established in 2014 at SUNY-ESF, which is part of her work to provide greater access for Native peoples to study environmental science, and to create programs which draw on the wisdom of both indigenous and scientific knowledge for our shared goals of sustainability.

Kimmerer received BS in Botany, 1975 from State University of New York, MS in Botany 1979 and PhD in Plant Ecology 1983 from University of Wisconsin, Madison.

Her current work spans traditional ecological knowledge, moss ecology, outreach to tribal communities and creative writing. Kimmerer has helped sponsor the Undergraduate Mentoring in Environmental Biology (UMEB) project, which pairs students of color with faculty members in the enviro-bio sciences while they

work together to research environmental biology. Kimmerer is also a part of the United States Department of Agriculture's Higher Education Multicultural Scholars Program. The program provides students with real-world experiences that involve complex problem-solving. Kimmerer is also involved in the **American Indian Science and Engineering Society (AISES)**, and works with the Onondaga Nation's school doing community outreach. Kimmerer also uses traditional knowledge and science collectively for ecological restoration in research. She has served on the advisory board of the **Strategies for Ecology Education, Development and Sustainability (SEEDS) program**, a program to increase the number of minority ecologists. Kimmerer is also the former chair of the **Ecological Society of America Traditional Ecological Knowledge Section**.

Robin Wall Kimmerer is an enrolled member of the Citizen Potawatomi Nation. She is the author of *Braiding Sweetgrass: Indigenous Wisdom, Scientific Knowledge and the Teaching of Plants*. Her first book, *Gathering Moss: A Natural and Cultural History of Mosses*, was awarded the John Burroughs Medal for outstanding nature writing, and her other work has appeared in *Orion*, *Whole Terrain*, and numerous scientific journals. She tours widely and has been featured on NPR's *On Being* with Krista Tippett and in 2015 addressed the general assembly of the United Nations on the topic of "Healing Our Relationship with Nature."

NEW WORLD UMBELLIFERAE & ECOTOURISM Mildred E Mathias

MILDRED ESTER MATHIAS

Born 1906-1995 Sappington, Missouri



Beginning her college career in the 1920s, Mathias originally had planned to study mathematics, but she instead switched to botany when classes for her major were unavailable, and when the Dean of Engineering would not give permission to a woman to take a math course in his male-only college. Mathias ended up getting her bachelor's, master's degree and PhD at Washington University in St. Louis by the age of 22. For her doctoral dissertation, Mildred Mathias produced a very fine taxonomic monograph on *Cymopterus* and relatives of the carrot family (Umbelliferae). New World umbellifer genera and species then were poorly defined-and she was set to change all that.

She married Gerald Hassler, a PhD in Physics, in Philadelphia in August 1930. From 1932 to 1936, Mathias was a research associate at the New York Botanical Garden and then at Berkeley by 1937. In 1939, Dr. Lincoln Constance at the U of California, Berkeley, joined Mathias in the study (and from 1940 to 1981 they published together more than 60 scientific papers on Umbelliferae of the New World, including descriptions of about 100 new species, hundreds of new combinations, and several new genera.)

Mathias, now mother of four, accepted a staff position at UCLA in fall, 1947, as herbarium botanist. In 1951, that position was elevated to lecturer, so that her talents could be utilized to teach plant taxonomy, and four years later Dr. Mathias was appointed as assistant professor in the Department of Botany, one of very few women who then held a faculty position at UCLA, and vice chair of the department.

In 1956, Mildred Mathias was appointed director of the Botanical Garden, and served as such until retirement in 1974, providing tireless service to horticultural organizations in California and around the world.

During the early 1960s Mildred Mathias, with several other professors, worked diligently to establish the UC Natural Land and Water Reserves System, now called the Natural Reserve System, whereby important parcels of undisturbed California habitats could be acquired and managed by UC for university teaching and research. These visionaries helped this to become a national model for conserving natural ecosystems.

When she retired in 1974, UCLA Extension persuaded Mildred Mathias to lead a natural history trip to Costa Rica. At that time tours to Costa Rica were mostly limited to a stop in San José and a trip up the volcano, but she led the first group of amateurs into the field for an experience they would value forever. Thereafter, Mildred Mathias had a new career, tour guide for adult education, and her stamina in the field was respected and renowned. Annually she visited Costa Rica and the Peruvian Amazon, and she immersed her adult students in native culture as well as all aspects of tropical biology and geography. Such tours are now a major source of foreign money in the country, called "ecotourism".

1913, LITERACY AMONG WOMEN IN INDIA, LESS THAN ONE PERCENT Janaki Ammal

E. K. Janaki Ammal

Born 1897-1984 Thalassery, India



Ammal came to the U.S. in 1924 on a study abroad for free Barbour Scholarship to the University of Michigan where she focused on plant cytology, the study of genetic composition and patterns of gene expression in plants. She specialized in breeding interspecific hybrids (produced from plants of a different species) and intergeneric hybrids (plants of a different genera within the same family). In 1925, Ammal earned a Masters of Science. In 1931, she received her doctorate, becoming the first Indian woman to receive that degree in botany in the U.S. Ammal was also India's first female botanist.

She taught at the Maharaja's College of Science in Trivandrum, then joined the John Innes Institute, Merton, London. She was then hired because of her expertise at the Imperial Sugar Cane Institute in Coimbatore, India now the Sugarcane Breeding Institute. The Institute was trying to bolster India's native sugarcane crop, the sweetest species of which (*Saccharum officinarum*) they had been importing from the island of Java. With Ammal's help, the Institute was able to develop and sustain their own sweet sugarcane varieties rather than rely on imports from Indonesia, bolstering India's sugarcane independence.

Ammal's research into hybrids helped the Institute identify native plant varieties to cross-breed with *Saccharum* in order to produce a sugar cane crop better suited for India's tropical environmental conditions. Ammal crossed dozens of plants to determine which *Saccharum* hybrids yielded higher sucrose content, providing a foundation for cross-breeding with consistent results for sweetness in home-grown sugarcane. In the process, she also developed several more hybrids from crossing various genera of grasses: *Saccharum-Zea*, *Saccharum-Erianthus*, *Saccharum-Imperata* and *Saccharum-Sorghum*. However, her status as a single woman from a caste considered backward created irreconcilable problems for Janaki among her male peers at Coimbatore. She faced caste and gender based discrimination.

She moved back to England to work at the John Innes Institute with geneticist and eugenicist Cyril Dean Darlington where she co-authored with him the **Chromosome Atlas of Cultivated Plants** which is still a key text for plant scientists today.

Impressed by her work, the Royal Horticulture Society invited Janaki to work as an assistant cytologist at their campus at Wisley, near Kew Gardens. Ammal investigated the effects of colchicine on a number of woody plants, including Magnolia.

Following a series of famines, she returned to India at the request of the Prime Minister to use her knowledge to help increase food production. However, disagreed with the deforestation taking place in an effort to grow more food. She became an advocate for the preservation of native plants and successfully saved the Silent Valley from a hydroelectric project. It is now a national park.

IN 1699, WENT TO SURINAME TO SKETCH ANIMALS & PLANTS Maria Sibylla Merian

MARIA SYBYLLA MERIAN

Born 1647-1717 Pennsylvania



Pineapple plant with insect generations

Merian was a German naturalist, botanical artist and scientific illustrator. She was one of the earliest European naturalists to observe insects directly. Merian received her artistic training from her stepfather, Jacob Marrel. Because of the guild system, women were not allowed to paint in oil. Merian painted with watercolours and gouache instead. Merian published her first book of natural illustrations in 1675 a three volume series of each with twelve plates depicting flowers.

She had started to collect insects as an adolescent and at age 13, raised silkworms. In 1679, Merian published the first volume of a two-volume series on caterpillars; the second volume followed in 1683. Each volume contained 50 plates that she engraved and etched with a description of the insects, moths, butterflies and their larvae she had observed. Merian documented evidence on the process of metamorphosis and the plant hosts of 186 European insect species. Her observations on the interaction of organisms are now regarded as a major contribution to the modern science of ecology with the depiction of insects and their plant hosts. She was the first to show that each stage of the change from caterpillar to butterfly depended on a small number of plants for its nourishment. Among her more significant contribution to science is the pairing of each larval lepidopteran, which she observed with a plant on which it feeds. She

collected and kept caterpillars and conducted experiments to confirm her observations. She documented that some caterpillars would feed on more than one plant, but some only did so if they were deprived of their preferred host plant.

After an unhappy marriage, her husband divorced her in 1692. Left with her two daughters, she made her living selling her paintings.

In 1699, the city of Amsterdam granted Merian permission to travel to Suriname in South America along with her younger daughter Dorothea Maria. The goal of the mission was to spend five years illustrating new species of insects. In order to finance the mission, Maria Sibylla sold 255 of her own paintings. She worked for two years, travelling throughout the colony and sketching local animals and plants. She recorded local native names for the plants and described local uses. In June 1701 an illness, possibly malaria, forced her to return to the Dutch Republic. Back in the Netherlands Merian opened a shop. She sold specimens she had collected and her engravings of plant and animal life in Suriname. In 1705, she published a book *Metamorphosis Insectorum Surinamensium* about the insects of Suriname. Merian's *Metamorphosis* has been credited with influencing a range of naturalist illustrators. Until her careful, detailed work, it had been thought that insects were "born of mud" by spontaneous generation.

POLLINATION IS THE DESTINATION: Our Plant Version of the Cosmopolitan Magazine

Unlike animals, plants do not have the luxury of picking themselves up to search for water, sunlight or mates. Instead they are anchored to the place they landed as a seed and forever more are at the whim of nature. Plants have evolved a multitude of cunning ways to deal with their limitations, but among their greatest feats is the creation of the flower. Flowers did not evolve to beautify the planet, but rather to entice mobile creatures to carry precious pollen from one flower to another of the same species. Like billboards along the biological highway, flowers promise a worthwhile detour to potential pollinators. Whether bat, bird or insect, each flower has evolved to best cater to their 'delivery men'.

COSMOS'

GET THE POLLINATOR OF YOUR DREAMS: Helpful Tips and Tricks

by Terry Huang



Do you close your eyes and dream about your pollenmate?

You try your hardest all season long to find a pollinator, but not one bats an eye at you? Then you agonize over all your desires of crosspollination and ripening to nearly the point of senescence? Don't worry you are not alone, this is something that we all go through. Being a flower can be tough, but you don't have to let it control your life.

During these dark winter times when you just want to pull your bud scales close and tight, it's really the perfect time to learn the art of attraction. By taking planned action your dreams will be closer to coming true; you are not destined to a lonely fate. Attracting your pollinator is all about marketing yourself. Perhaps you are just sending out the wrong signals – something we all do when we get desperate.

What is your message and what is your brand? Are you a generous soul or a sly schemer? Are you a free spirit or are you a devoted partner? These questions and more all matter, and figuring them out will help you send out the right signal to get the right pollinator. Here are seven tips to attract the best wingman to help you find your perfect mister and missus.

1. **TIMING IS EVERYTHING.** Are you an early riser or a late-night socialite? Though it may sound obvious, trying to attract someone when they are not even up is a terrible idea. If you're up during the day maybe try your luck with bees, flies, butterflies, or birds. If you're up at night bats, moths, and beetles just might be your thing.
2. **GET IN SHAPE.** Not all flowers are created equal especially when it comes to accommodating a pollinator. The way your flower is shaped will naturally determine who would be best at reaching your pollen. If your flower is a long thin tube, maybe go for a long tongued bee or moth instead of that chunky, clumsy bat. Comfort and accessibility is a trait everyone likes.
3. **SIGNATURE SCENT.** Floral elegance, avant-garde musk, or a clean slate: whatever your preference in fragrance there are pollinators who will find it irresistible. Knowing the preferences of your target audience well is key. Fresh and sweet? Sounds like a honeybee. Fetid and acquired? Perhaps a fly. Once you get the recipe right apply liberally and they will come.
4. **COLOR ME POLLINATED.** They say blue is calming and red is energizing, but whatever the case, all pollinators have their proclivities. If you are a fiery scarlet, birds and butterflies will flock to you, or if you are pristine white like snow on a moonlight night, you'll be a beacon to moths and bats. Pick your colors wisely because every hue has something to say.
5. **REWARD...OR NOT.** In this world there are givers and takers, and most of the time the lines are not that clear. Whether you are a nectarous sweetheart or a cunning seductress you can offer whatever reward you wish. Just remember, you've got to make an offer that is too good to refuse.
6. **QUALITY CONTROL.** To give your seeds the best start in life, keep yourself clear and ready for crosspollination. Station your style(s) well away from your stamens, and timing it so that your stigma matures before your anthers shed pollen is further insurance. If worse comes to worst self-pollination can help you in a pinch, but remember nothing good ever came from inbreeding.
7. **HAVING THE ONE.** Or maybe five. Pollination is one of those tricky things where you must trust that your pollen has found its way to a suitable mate. If you are detailed oriented then finding a pollinator that will solely service your species is great reassurance. If you are more laissez faire however, by hiring a retinue of pollinators one is bound to eventually deliver the goods to the right place. Do what feels right.

To get you on the right track take this short compatibility quiz to see who is your ideal pollinator. Remember what letters you get. Who knows, the results may just delight you.

1. What is your ideal fragrance?

- a. Acrid, but oh-so-au naturell!
- b. No scent. I am hypoallergenic.
- c. Sweet and fresh like a clear spring day.
- d. Rich and sumptuous like Chanel No.5.
- e. Musky and boozy.
- f. I can't pick one.

2. When are you the most productive?

- a. Anytime during the day, but more in the afternoon.
- b. More morning, but throughout the day really.
- c. Busy, busy from dawn until dusk.
- d. At dusk. Secretly under the cover of darkness.
- e. Late night. I really come alive after dark.
- f. Depends.

3. What's your type?

- a. Chubby and cute.
- b. Svelte like a swimmer.
- c. Nimble like an acrobat.
- d. Light like a dancer.
- e. Built. I lift, bro.
- f. I don't have a type.

4. When friends come over you offer:

- a. Nothing. I got out of bed and got dressed, isn't that good enough?
- b. Nectar. They can help themselves.
- c. Nectar and pollen. I like to cook meals for my friends.
- d. Some nectar. Just light refreshments.
- e. Lots of nectar. We love drinking!
- f. I don't invite friends.

5. What colors do you associate yourself with the most?

- a. Earth tones: burgundy, browns, and blacks.
- b. Hot colors: reds, oranges, and magenta.
- c. Pretty blues or warm yellows.
- d. Crisp whites.
- e. Muted tones: beige, mauve, sage, and creams.
- f. Whichever.

—Your ideal pollinator results on page 15

Can you guess the ideal pollinators for these flowers? Each have evolved traits to attract them.



Aristolochia grandiflora



Aristolochia gigantea



Caesalpinia pulcherrima



Tagetes erecta



Datura metel



Agave parryi



Cobaea scandens



Zea mays (maize)

TRIBETA TUTORING ONLINE & IN PERSON: Monday - Thursday: starts Mon October 10th

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

Tutoring starts during the third week of the quarter on October 10th 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/tutoring?authuser=0>

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/tutoring?authuser=0>

2022-2023 Executive Board



TriBeta Biological Honor Society

Co-President, ALLISON DECRACKER

Vice President, DAVE YOUNG

Vice President, MIRA ROTH

VP of Tutoring, VICTORIA LE

VP of Tutoring, BILL YOUNG

Adviser, BRIAN BUCHWITZ

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.



Pumpkin Carving Event Coming Soon!





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.

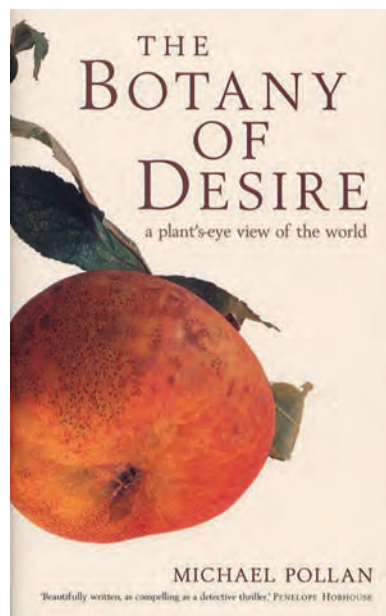
All Humans Are Welcome.

BIO BOOK CLUB: *The Botany of Desire* by Michael Pollan

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.

Every schoolchild learns about the mutually beneficial dance of honeybees and flowers: The bee collects nectar and pollen to make honey and, in the process, spreads the flowers' genes far and wide. In *The Botany of Desire*, Michael Pollan ingeniously demonstrates how people and domesticated plants have formed a similarly reciprocal relationship. He masterfully links four fundamental human desires—sweetness, beauty, intoxication, and control—with the plants that satisfy them: the apple, the tulip, marijuana, and the potato. In telling the stories of four familiar species, Pollan illustrates how the plants have evolved to satisfy humankind's most basic yearnings. And just as we've benefited from these plants, we have also done well by them.

So who is really domesticating whom?



PAUL'S PECULIAR PLANT PICK FOR AUTUMN: *Welwitschia mirabilis* from So. Africa



Living specimens of *Welwitschia mirabilis* look very much like fossils found in Brazil, that are over 112 million years old. They represent the only remaining remnant of an offshoot of the order Gnetales in the Gymnosperms. The entire population is found in the Namib desert in a narrow strip of land extending from central Namibia to into southern Angola. This conifer consists of a short stem, two leaves and a tap root. **The plant has only two leaves in its lifetime.** The meristem is at the base of the leaves and grows continuously. This is significant because some specimens have been estimated to be 1500 or more years old! The stem from which the leaves grow, develops a deep groove at the apical meristem where vertical stem growth ceases. The circumference of the groove on ancient plants can as much as 8 meters.

Much of the native range of *Welwitschia* receives less than a half an inch of rain annually. The leaves have a leathery texture which helps deter water loss during the hot days. In the wild, the natural fraying and splitting of the leaves helps the leaf structure to curl around the base of the plant, directing any water runoff towards the roots. This also provides very localized shade, which helps to cool the soil beneath the tangled leaves.

stomata are open during the day. Carbon dioxide (CO₂) enters the plant through the stomata where it is used in photosynthesis to make sugars and oxygen (O₂) is released as a byproduct. In CAM plants, the stomata are closed during the day and open at night. Therefore, CO₂ uptake occurs at night when it is cooler and evaporative demand is lower, but there is no light for photosynthesis. The CO₂ is stored in the form of malate in large vacuoles in the cells. The next day the malate is decarboxylated and the CO₂ is used to make sugars. Shifting CO₂ uptake to nights reduces precious water loss from the plant. The downside of CAM is that only a limited amount of CO₂ can be stored each night, reducing total potential growth.

Welwitschia is one of only two gymnosperms known to use CAM. This may be secondarily useful because there are often night time fogs in their habitat. Because the stomata are open during the night to absorb CO₂, they may also collect some moisture from the fog. The four large specimens in the collection are from seed planted in the late 1980's. Fifteen were grown to cone bearing size. Thirteen produced male cones, one produced female cones, and one has not yet produced cones. We retain the female, two males and the unknown specimen. The rest have been donated to other institutions.

Welwitschia mirabilis is located in the GH1 Desert Room and is this quarter's Peculiar Plant Pick from Dr Paul Beeman.



Female Cones



Male Cones

OUR COLLECTION Includes Plants that are Found Only in World Class Botanic Gardens

THE TEACHING COLLECTION CONTAINS PLANTS WHICH ILLUSTRATE:

TAXONOMIC DIVERSITY OF GREEN PLANTS (MAJOR PLANT GROUPS)

- Non-vascular plants: bryophytes (mosses, liverworts, hornworts)
- Vascular spore plants: ferns, horsetails, club mosses
- Seed plants:
 - Gymnosperms: cycads, conifers, Ginkgo, *Welwitschia*, Gnetum, Ephedra
 - Angiosperms: monocots, dicots

HABITAT DIVERSITY OF GREEN PLANTS:

- aquatic plants
- wetlands plants
- tropical plants, rain forest plants
- temperate plants
- desert and arid land plants

PLANT ADAPTATIONS:

- for living in water
- for living in trees
- for living in rain forests
- for water conservation in dry habitats
- for very bright and very dark habitats
- for different pollinators
- for nutrient poor bogs (carnivorous plants!)
- for climbing trees: vines

UNUSUAL PLANTS:

- plants with few or no leaves: cacti and plants that look and work like cacti but aren't
- plants with no roots
- plants with ants
- plants with their own swimming pools
- plants that supply useful food, fiber and chemicals
- plants with enticing aromas and plants with foul foetid odors

STAFF HIGHLIGHT Celebrating 30 years of Greenhouse Plants and Their Stories



PAUL BEEMAN
Plant Technician

Working in the Greenhouse over thirty years, one starts to think Dr Paul Beeman as just part of the Greenhouse. He is always there, always willing to tell you a plant's story, always pointing out what is blooming, always seems to be propagating some kind of special, weird or incredible plant that needs to be added to the collection, always willing to tell you about pollination syndromes and insects all in his funny, witty way. Dr Beeman's special powers are propagation and his knowledge of ALL the plants in the collection. Paul is literally part of our teaching collection with his knowledge of all our plants. Doug Ewing, former manager of the Greenhouse was the creative force that made the current teaching collection possible but Dr Beeman will plead guilty to enthusiastically aiding and abetting the process. Dr Beeman has said he will stay as long as he is still having fun. We wish him many years of fun.

HERE ARE HIGHLIGHTS OF HIS EDUCATION:

BS Entomology Washington State University

MS Plant Molecular Biology / Evolutionary Phylogenetics Ctr for Urban Horticulture, UW

PhD Soil Chemistry / Plant Nutrition College of Forestry University of Washington

Began as a volunteer in the UW greenhouse in 1984 when I started my Masters Degree. Worked half time for a few years. Quit to finish writing my Doctoral Dissertation and did other things. Started working half time again in 1999 until now.

Volunteered at Volunteer Park Conservatory and Woodland Park Zoo Horticulture (~2000 hrs). Works half-time at the Indoor Sun Shoppe in Fremont since 2001.

COSMOS': Key for your Ideal Pollinator



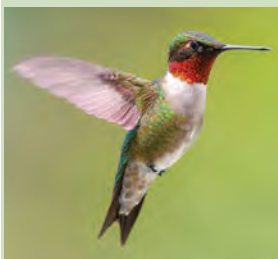
A's then your ideal pollinator is a **CARRION FLY**: They love you because you stink of rot and death.

PLANTS THEY LOVE:
Aristolochia grandiflora and
Aristolochia gigantea



D's then your ideal pollinator is a **HAWK MOTH**: They like the luxurious quality and style of your liaisons.

PLANTS THEY LOVE:
Datura metel



B's then your ideal pollinator is a **HUMMINGBIRD**: They are captivated by your hot passionate colors and will fiercely protect your supply of nectar.

PLANTS THEY LOVE:
Caesalpinia pulcherrima



E's then your ideal pollinator is a **BAT**:

They are engrossed by your yeasty fragrance and torrents of thick nectar.

PLANTS THEY LOVE:
Cobaea scandens and
Agave parryi



C's then your ideal pollinator is a **HONEY BEE**: They are drawn to your wholesome generosity that they conjure into sticky golden amber.

PLANTS THEY LOVE:
Tagetes erecta



F's then your ideal pollinator is a **WIND**:

You have trust issues and would rather cut out the middleman.

PLANTS THEY LOVE:
Zea mays (maize) and
Welsitschia mirabilis

And IF YOU HAVE A MIX OF LETTERS then you're a generalist: Really every and anybody will do!

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 pollinator.**



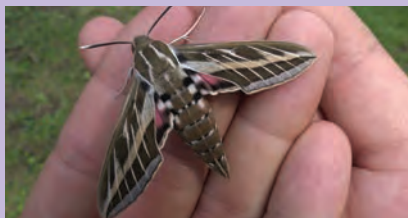
Janet Germeraad
Academic Services Director
Janetjg@uw.edu

The Bumble Bee is my favorite pollinator because they are just so darn cute.



Jason Patterson
Academic Counselor, Senior
patterj@uw.edu

Hawk moths – These often furry insects do more work than many of their daytime counterparts; visiting more species overall and often go for those that release their scent at night.



Julie Martinez
Program Coordinator
juliebio@uw.edu

I love that hummingbirds pollinate our gardens and add a splash of color to our landscapes.



AUTUMN QUARTER 2022 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.

