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# Nemophila

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## Newsletter of the California Botanical Society

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### Membership - renewal for 2021

Thank you for your membership and support of the California Botanical Society. As 2020 draws to a close, please remember to renew for 2021 since our memberships are based on the calendar year. You can renew via mail or online (via PayPal) at: <https://calbotsoc.org/membership/>.

To renew via mail, you can use the mailing slip in the upcoming *Madroño* issue or email us at [membership@calbotsoc.org](mailto:membership@calbotsoc.org) to request a subscription form.

We are looking forward to a few exciting events next year, including a new monthly virtual speaker series, a virtual symposium in Spring, as well as an upcoming *Madroño* special issue on phenology. We are also working to continue our Botany Ambassador program, educational grants, and K-12 science fair awards programs. We hope you will join us in participating and contributing to these events and programs.

Wishing you all the best in 2021!

## Election Results

The California Botanical Society is pleased to announce that several new members have been confirmed to the Council through membership vote! Please learn more about our new President and Members at Large:

### **Amy Litt – President**

Amy got her PhD through the Plant Biology jointly administered by The New York Botanical Garden and City University of New York, under the mentorship of Scott Mori and Dennis Stevenson.



She studied floral morphology and phylogeny of *Vochysiaceae*, a relatively small largely neotropical family in the Myrtales with highly unusual flowers. Subsequently she did a post-doctoral project under Vivian Irish at Yale University learning methods to study the evolution of the developmental mechanisms that determine floral morphology. After one year at University of Alabama, she returned to The New York Botanical Garden to study the evolution of flower and fruit development, as director of the plant genomics program.

After nearly 10 years at NYBG, it was time for a change, and six years ago she

joined the Botany and Plant Sciences faculty at UC Riverside. She has continued her studies of the genetic regulation of fruit development, but the spectacular diversity of the southern California flora and of the California Floristic Province, drew her back to field work and systematics. She and her students have been developing a collaborative effort aimed at understanding patterns of diversification in manzanitas, with botanists and ecologists from multiple institutions across the state. She is also nominal director of the UCR Herbarium, which is participating in the state-wide NSF-funded effort led by Cal Poly SLO to digitize and image herbarium specimens for phenological analyses. Until very recently she was the program director for the Botanical Society of America, responsible for organizing the annual six (or more)-society Botany conference.

### **Nishi Rajakaruna - Member at Large**

Nishi Rajakaruna fell in love with plants at a young age during a visit to Sinharaja Rainforest, a lowland tropical rainforest in Sri Lanka. He left Sri Lanka in 1990, at the height of the country's civil war, to pursue his dream to be a botanist.



He studied botany with late Dr. Craig Greene, a leading authority on the

taxonomy of the grass genus *Calamagrostis*, the reed grasses, and on the flora of the Mt. Desert Island region of Maine, and received a BA in human ecology from College of the Atlantic. Upon graduation, he conducted his post-undergraduate practical training in plant ecophysiology with late Prof. Fakhri Bazzaz at Harvard University. Nishi's graduate research on the evolutionary ecology of California native *Lasthenia californica* complex, under the supervision of Prof. Bruce Bohm and Dr. Jeannette Whitton, earned him a MS and a PhD in botany from the University of British Columbia, Canada. Nishi conducted post-doctoral research on the ecophysiology of serpentine tolerant woody plants with Dr. David Ackerly at Stanford University. His current research examines how plant diversity, ecology, and evolution are influenced by serpentine and other 'unusual' soils, including those with high heavy metals or low nutrients. He has taught botany at College of the Atlantic and San José State University for 12 years and spent a year as a Fulbright Senior Scholar in Sri Lanka and India. He is currently an associate professor in plant biology at California Polytechnic State University (San Luis Obispo) where he has been teaching general botany, ethnobotany, and biogeography since 2017. Over his 16-year teaching career Nishi has taught many botany courses, including edible botany, ethnobotany, plant taxonomy, plant evolution, geobotany, and field botany.

Nishi has published 90 peer-reviewed papers and book chapters on plant-soil relations of serpentine and other harsh rock outcrops in California, Maine, South Africa, Sri Lanka, Iran, and Russia and is the co-editor of two key treatments on plant life on serpentine soils and other harsh environments [Serpentine: Evolution and

Ecology in a Model System (2011) and Soil and Biota of Serpentine: A World View (2009)] and a book titled Plant Ecology and Evolution in Harsh Environments (2014). He has served on the scientific advisory committees of the International Conference on Serpentine Ecology since 2006 and was the Recording Secretary of the California Botanical Society 2009-2010. He was the Editor-in-Chief of *Rhodora*, the Journal of the New England Botanical Club, from 2014-2019 and is currently on the Board of Directors of the California Native Plant Society, San Luis Obispo Chapter. He holds an honorary research professor position at the School of Biological Sciences, North-West University, Potchefstroom, South Africa.

Nishi is excited to rejoin the council of the California Botanical Society and take an active role in the Society's education and outreach efforts.

### **Muriel Poston - Member at Large**

Muriel E. Poston, Ph.D., is the former Vice President for Academic Affairs/Dean of Faculty at Pitzer College where she is currently a Professor in Environmental Analysis.



In 2019, Dr. Poston completed a three

year appointment as the Division Director in the Division of Biological Infrastructure of the Biological Sciences Directorate at the National Science Foundation (NSF). Prior to coming to Pitzer, Dr. Poston served as the Division Director for the Human Resource Division in the Education Directorate at the NSF. She was Dean of Faculty and Professor of Biology at Skidmore College from 2005-2011. Her education research interests are in undergraduate biology education and her scientific research is in plant systematics, especially the evolutionary relationships of the neotropical family *Loasaceae*. Dr. Poston spent over twenty years as a professor in the Department of Biology/Botany at Howard, where she focused on undergraduate education, served as curator of the university herbarium, and worked to develop the environmental science program.

Dr. Poston also served as a program director and deputy division director in the Biological Sciences Directorate at NSF. From 2006-12 she was a member and chair of the congressionally mandated Committee on Equal Opportunities in Science and Engineering and a member of the NSF Advisory Committee for the Biological Sciences Directorate. She is a Fellow of the American Association for the Advancement of Science, and is currently a member of the Board of Directors of the American Institute of Biological Sciences as well as the Board of Directors of the Organization for Tropical Studies. Dr. Poston earned a B.A. degree from Stanford University, M.A. and Ph.D. degrees from the University of California at Los Angeles, and a J.D. degree from the University of Maryland.

## Paul Silva Student Research Grant Awardees

### *Ernesto Chavez-Velasco*

University of California, Santa Cruz

***Does coastal fog interact with drought to affect plant water use and endophytic pathogenesis in California coastal prairies?***



Climate change will potentially exacerbate drought stress for California plants. Previous research shows native plants in the coastal zone can sometimes mitigate drought stress through foliar water uptake or by utilizing fog drip and cloud shade to reduce water loss. Drought stress may increase fungal virulence, which has shown to cause a direct loss of forage production and the removal of legume or grass components. We are investigating the potential for fog to mediate stress-induced pathogenesis with a greenhouse experiment, and whether endophytic fungi mediate drought induced virulence in coastal grasslands. We will also investigate the interactive effect of drought and fog on *Stipa pulchra* and *Sidalcea malviflora* by measuring their survivorship, biomass,  $\delta^{13}C$  and percent damage from pathogens. We expect fog to mediate drought stress and reduce the effects of pathogenic degradation. However, we also anticipate

that increased moisture conditions could potentially affect the establishment of endophytic fungi. In a future consisting of increased precipitation and, identifying potential endophytic symbionts may aid restoration practitioners in combating potential pathogenesis induced by drought stress. Our results may also provide insight into how endophytic symbionts affect the productivity and potential susceptibility of coastal prairies to invasion, as well as their implications for shaping ecosystem structure.

### **Jenna Ekwealor**

University of California, Berkeley

#### ***UV tolerance in Mojave Desert mosses***



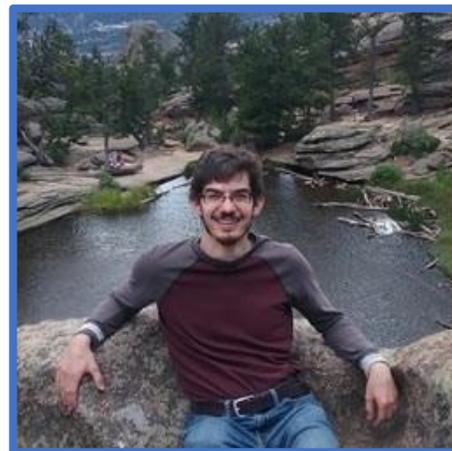
Mosses are small, non-vascular plants that are poikilohydric and desiccation tolerant, which means their tissues quickly equilibrate to ambient water content and they are able to recover from being completely dry. Terrestrial mosses will dehydrate and go dormant between precipitation events. While many mosses are found in cool, low-light environments, several species are abundant in deserts where they are desiccated for much of the year. Mosses that live in the desert spend most of their time in a desiccated, inactive state exposed to high solar radiation due to low atmospheric water vapor. In nature,

desert mosses not only have to withstand the damage of desiccation itself but must also be able to recover from any damage incurred while dry or have adequate mechanisms for protection. Mosses have no ability for active repair when dry and face risk of damage to sensitive molecules, including those in the photosynthetic apparatus and DNA which absorb wavelengths in the UV spectrum. My research investigates UV protection mechanisms used by two desert mosses *Syntrichia ruralis* and *S. caninervis*, two extremely desiccation-tolerant Mojave Desert mosses. These plants can lose almost all of their cellular water and recover after rehydration. For my project I am investigating the transcriptomic responses to acute and chronic UV exposure to understand the genes involved in UV tolerance and the evolutionary history of this trait. This research will contribute to understanding how these plants are able to survive extended periods of intense solar radiation while dry and dormant in their desert habitat.

### **Jacob Ewald**

California State University, Chico

#### ***Species boundaries in two northern California Monkeyflowers***



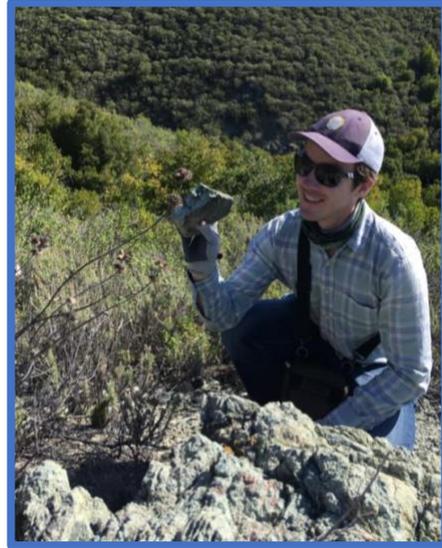
Recently diverged taxa are thought to maintain species boundaries via the evolution of reproductive barriers. Pre-zygotic barriers such as divergent habitat, flowering phenology, and floral morphology work additively with post-zygotic barriers such as hybrid sterility or inviability to reproductively isolate species. The close relatives *Mimulus guttatus* and *Mimulus glaucescens* broadly overlap in range, have similar flower morphology, and flower at the same time. Thus, no barrier to interbreeding is apparent, and they freely interbreed in the greenhouse. However, the two species are not known to hybridize in nature. Previous research characterized fourteen potential barriers to reproduction, but did not find complete isolation. Thus, either unmeasured barriers exist or hybridization occurs in nature. I will conduct microhabitat analyses in *M. guttatus* and *M. glaucescens* habitat to evaluate the strength of microhabitat as a reproductive barrier. I have also collected leaf and bract tissue from natural populations; I will run genetic analyses on these tissue samples to test the hypothesis that introgression occurs in nature.

Finally, I am currently collecting data on bract shape, glaucous coloration, and trichome density in greenhouse-grown parent species and hybrids to determine the genetic basis of taxonomically informative traits. Ultimately, elucidating the relationship between *Mimulus guttatus* and *Mimulus glaucescens* will provide insight into the process of speciation as well as the evolutionary history of this diverse genus.

### **Michael Mulroy**

California State Polytechnic University, San Luis Obispo

#### ***An investigation of lichen biotas of ultramafic and sandstone outcrops along a maritime gradient in central California***



Saxicolous (rock-dwelling) lichen communities vary tremendously in response to abiotic environmental factors. While such variation is widely recognized, little research has been carried out to quantify the effects of abiotic factors on saxicolous lichen community composition. I am investigating the roles of substrate properties and maritime influence in determining species composition and distributions in saxicolous lichen communities. My study will compare ultramafic (i.e., serpentinite) and siliceous sandstone lichen communities across a large-scale (~65 km) coast-inland environmental gradient of decreasing maritime influence in central California. Lichen communities on both substrates across the gradient are being assessed via quadrat sampling and species inventory methods. For each of our 18 sampling locations, we are determining maritime influence factors, such as aerial salt

deposition and climate variables, and quantifying substrate properties including elemental chemistry and microtopography. We hypothesize that 1) maritime influence will cause lichen communities to be more species-rich and diverse closer to the coast, similar to northern coastal scrub vascular plant communities in the same region; and 2) ultramafic and sandstone communities will be more compositionally similar in the coastal zone than the interior due to maritime influences overriding substrate effects. In order to effectively meet land management and conservation goals in the context of rapid global changes, it is critical that we improve our understanding of spatial relationships between species and environmental variables. This study will improve our understanding of saxicolous lichen community ecology and regional species distributions, as well as provide a rich dataset for future research on lichen-substrate relationships.

### CalBotSoc Botany Speaker Series!

The California Botanical Society is excited to announce a new virtual speaker series. This speaker series will be held via Zoom at 7pm PST on every second Thursday, starting with a talk by Dr. Lorena Villanueva-Almanza on January 14<sup>th</sup> 2021.

The zoom link will be emailed during the week prior to each talk. We are especially aiming to showcase and promote the work of early career botanists. If you are an early career botanist interested in giving a talk of general interest to our members, please email us at [membership@calbotsoc.org](mailto:membership@calbotsoc.org).



**Dr. Lorena Villanueva-Almanza**  
Botany Speaker on January 14<sup>th</sup> 2021

**“A Tale of Two Palms: the genus *Washingtonia* in Alta and Baja California”**  
via Zoom

(link to be emailed prior to the event)

### Virtual Student Symposium – Coming 2021

We are pleased to announce that we are working to host a virtual conference for our biennial student symposium, to take place in Spring 2021. We hope you will join us! Please keep a look out for further announcements.

We are currently looking for a faculty host for this event. If you would like to host or be involved in the development of this symposium, please email us at: [membership@calbotsoc.org](mailto:membership@calbotsoc.org).

### Open Positions - Call for New Council Members

As part of the cycle of leadership for California Botanical Society there are three open board positions open on our Council: Outreach coordinator, Membership Chair,

and Corresponding Secretary.

We are seeking enthusiastic candidates with vision to step into our Outreach coordinator, Membership chair, and Corresponding Secretary roles. Below are descriptions of each position. All are volunteer positions that support and advance the mission of our not-for-profit society. Please email us at [membership@calbotsoc.org](mailto:membership@calbotsoc.org) with information about your qualifications and vision for the position you are interested in.

### **Outreach Coordinator**

This position involves coordinating and recruiting participants to the Botany Ambassador program. Responsibilities include promoting the Botany Ambassador program, creating and connecting members with opportunities to share and communicate botany, and attending monthly council meetings during the academic year.

The Outreach Coordinator directly supports and cultivates the Botany Ambassador program. Current branches of the Botany Ambassador program include botany presentations for K-12 students and lay summaries of academic papers published in *Madroño*. If you are passionate about science communication and would like to create opportunities and support others in communicating science, this is the position for you!

### **Corresponding Secretary**

This essential role aids in processing bills and reimbursements and sending out annual mailings and fliers (e.g., President's letter and banquet announcements). Responsibilities include assisting our administrator and treasurer in filing

paperwork each year for the running of *Madroño*, managing the corresponding secretary email account, and attending monthly council meetings during the academic year. This position is especially for someone interested in gaining business administration experience, or who wants to learn more about the workings of nonprofit organizations and the publishing process.

### **Membership Chair**

This position manages our membership email and is most involved with directly interfacing with our members. This role includes creating the monthly mailing insert in the *Madroño* issues, submitting print orders for *Madroño*, organizing the mixer at the Northern California Botanists Symposium, and other publicity and outreach events to engage and increase membership. There is a lot of flexibility to start new programs that will support and benefit our members. This role is perfect for a creative individual interested in interacting with other members and expanding their network!

### **Contribute to *Nemophila***

Nemophila is a digital newsletter compiling and disseminating information and announcements for the members of the California Botanical Society, as well as highlighting and sharing member news and stories. We are seeking short articles, letters to the editor, photos, and other items of interest to the members of the California Botanical Society concerning the Western North America region. Please email your submissions to us at: [membership@calbotsoc.org](mailto:membership@calbotsoc.org)

