



# THE JEPSON GLOBE

A Newsletter from the *Friends of The Jepson Herbarium*

VOLUME 30 NUMBER 1, Spring 2020

## Curator's column: California plant extinction

By Bruce G. Baldwin

California's status as a biodiversity hotspot is well established and based not only on the exceptional richness and endemism of our flora but also its endangerment as a result of human impacts. Part of the mission of the Jepson Herbarium is to promote conservation of the California flora through our scientific and educational efforts, including the California Plant Phylodiversity Project and the Jepson Workshop Program. Other institutions and organizations, such as the California Native Plant Society (CNPS), play essential roles in California plant conservation, as well. A critical component of all of those efforts is to prevent the decline of native plant taxa and other evolutionarily distinct lineages below thresholds where loss of ecological function and extinction may follow.

Understanding the history of plant extinction and the magnitude of extinction in California is important to forestalling future extinction events. Documenting extinction is difficult, however, in part because the complete absence of an organism is difficult to demonstrate — it may still occur somewhere undetected. Maintenance of a presumed-extinct category for native plants by CNPS and the Jepson Flora Project has given increased impetus to botanists to attempt to rediscover such taxa, and led to memorable success  
(Curator's Column continued on page 4)

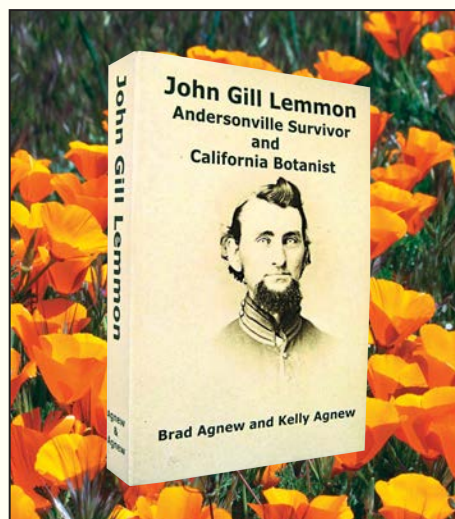


Photo by Alan Schmierer.

## John Gill Lemmon: Andersonville Survivor and Notable California Botanist

By Kelly Agnew

In a book published in January 2020, the father-daughter team Brad and Kelly Agnew explore the life of John Gill Lemmon, a veteran of the Civil War who became California's foremost amateur botanist in the years following his ordeal as a prisoner of war at two Confederate prisons, Andersonville, Georgia, and Florence, South Carolina.

The Archives of the University and Jepson Herbaria provided critical content for the book, which discusses Lemmon's life as a son of a Michigan farming family, his Civil War experiences, and his life-long obsession with botany. The biography also provides some historical context, describing the  
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## CNPS and UC Berkeley Collaborate to Add Lepidoptera Host Plant Information to Calscape.com

By Dennis Mudd

The California Native Plant Society, the Jepson Herbarium, and the Consortium of California Herbaria have been collaborating on the development of [Calscape.org](https://Calscape.org) for approximately 5 years, with the goal of helping Californians restore nature in their own gardens. The site estimates the natural geographic range of the native plants in California and makes it easy for homeowners to choose native plants that naturally occur where they live and that also match up with their other landscaping goals. Calscape is now the most popular native plant landscaping site in the state, approaching 2 million active users.

Until fairly recently, Calscape focused only on plant-specific information. There has been an increasing demand from our users for guidance on creating habitat gardens that support a diverse range of native animal life. As we researched how to support native animal life in gardens, it became  
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### ALSO IN THIS ISSUE

- Undergraduate Research Program
- Galapagos scholars visit
- Endowment funds report
- Jepson eFlora revisions
- Staff updates

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clear that the key is to grow California native plants that support native insect herbivores.

Few Californians know that 90% of insect herbivores can eat only a small number of native plant species, often from just one genus. Most evolved to overcome the chemical and structural defenses of just a relatively small number of plant species in their native range. This is the primary reason why native landscapes support 35 times more insect biomass than non-native landscapes.

The specialized relationship between native plants and insect herbivores is a key foundation of our whole ecosystem. Terrestrial birds, insects, and a large part of the rest of the food web depend either directly or indirectly on native plants. For example, 96% of terrestrial bird species rely on insects to feed their young. So, if the required native plants are not present in an area, nearly all insect species will die out in that area along with much of the bird and other animal life that depend on them. Unfortunately, this is what is happening in most of the developed areas of the state.

To expand the breadth of Calscape and further encourage the use of native plants in gardens, we have added native host-plant information for California native lepidoptera (butterflies and moths) so that Calscape can make

suggestions about native plant species and the butterflies and moths they might support.

To do this, we first needed to estimate the natural geographic ranges of Californian lepidoptera. Our estimates are based on approximately 200,000 geo-referenced field observations of native California lepidoptera from around the state. For a given square mile to be included in the estimated geographic range of a particular lepidopteran species, that species must have been observed within 50 miles of that square mile, and that square mile must fall within the ranges of annual precipitation, summer precipitation, coldest month average temperature, hottest month average temperature, and humidity in which that species has been observed in the state.

Plants that are shown as hosts for a particular lepidopteran species must meet two requirements: 1) The genus of that plant species must be a known host for that species of butterfly or moth and 2) the natural geographic range of that plant species must overlap with the natural geographic range of that butterfly or moth species.

Now people can go to the *Calscape.org* butterfly section and type in any California address to see which lepidopteran species are native to their location and which native plants to grow to support any given lepidopteran

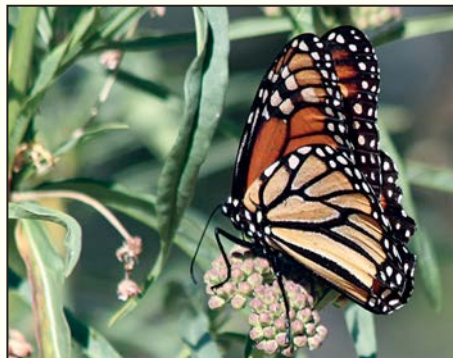
species (for example, Pipevine Swallowtail). Users can also go to most of the plant species pages on Calscape to see which lepidopteran species are supported by that given plant (for example, California Milkweed). Plant lists can even be ordered to show which native plant species are the most important for supporting lepidoptera in their area (for example, plants native to Sacramento listed in order of number of lepidoptera hosted).

Douglas Tallamy, an ecologist and one of the nation's most published researchers on the specialized relationships between native plants and insects said this about Calscape: "If you care about the collapse of butterflies and other pollinators, this is a simple tool you can use to help in a very real way. The problem is loss of habitat, so restoring these host plants to our neighborhoods and green spaces is a powerful solution." 🦋

*Particular thanks to the Jepson Herbarium and Essig Museum of Entomology at UC Berkeley and Douglas Tallamy of the University of Delaware's Department of Entomology for their guidance in creating this tool. Many other institutions and individuals have helped with this project and provided data. Please see [Calscape.com](https://www.Calscape.com) for a full list.*



*Painted lady on desert lavender.  
All photos by Dennis Mudd.*



*Monarch on a Narrow Leaf Milkweed  
(Asclepias fascicularis)*



*Sara orangetip on black sage.*



## Undergraduate Research Apprentices Gain Research Tools and Plant Knowledge

By Carol Wilson

In undergraduate education, getting involved in research is encouraged because it provides an opportunity for students to explore interests, connect with mentors, and gain important skills in communication and working within a team. One program at UC Berkeley, the Undergraduate Research Apprenticeship Program (URAP), provides a platform where undergraduates seeking research experience can join ongoing projects and become involved in the diverse research life of the University. URAP provides an encouraging environment where students approach faculty members who have already expressed an interest in working with and training undergraduates.

Three URAP students have been working with associate researcher Carol Wilson and research associate Clyde Calvin on two projects in the University and Jepson Herbaria. Although there are two projects (one on mistletoe and another on *Iris*), there has been considerable collaboration among the teams, with URAP students assisting each other, particularly with portions of the research where a student has taken the lead.



Michael Sandor and Zoe Boosalis

A native of San Diego, Kenneth (Kenny) Trang started in the Spring 2019 semester as a first-year student alongside Carol and Clyde to curate the newly donated worldwide collection of mistletoe haustoria, which represents a unique collection unknown in other herbaria. Mistletoes are parasites that grow on host plant branches. Haustorial specimens are collections of the portion of the mistletoe where it invades the host plant. This is especially exciting because haustoria offer unique insights into the diversity of stems and roots among different families and genera of mistletoe and how interactions with the host plant affect the forms of these organs.

The research portion of the project is a study comparing haustorial type to habitat in Australian mistletoes from the family Loranthaceae. Kenny has taken the lead on this research, mapping the distribution of the 11 genera of Loranthaceae mistletoes in Australia and investigating the correlation of distributions of haustorial type to climatic data. Kenny presented the results of distributional data at Botany 2019, an annual meeting of US botanical societies in Tucson, Arizona, in a poster titled “Ecological niche modeling of Loranthaceae haustorial morphology across Australia.” He is currently working with Carol and Clyde on the first draft of a manuscript, summarizing the results of this research, which is targeted for submission in a peer-reviewed research journal by the end of the academic year.

The second project is on *Iris* in the subgenus *Xiphium*, a clade centered in Spain but also occurring in Algeria, Andorra, France, Italy, Morocco, and Portugal. Two URAP students, Zoe Boosalis and Michael Sandor, have been working with Carol on this project. Zoe, a native of the Bay Area, began in the Spring 2017 semester during her



Kenneth (Kenny) Trang working with the haustoria collection in the Herbaria.  
Photo by Staci Markos.

second year at UC Berkeley, assisting with laboratory work to extract DNA from samples and produce DNA libraries for sequencing. Typically seven species and several color or leaf forms have been recognized in subgenus *Xiphium*, although some researchers have suggested that these forms represent distinct species or subspecies. This portion of the project uses molecular data to investigate relationships among taxa within the subgenus.

Zoe also led the portion of the research project investigating the role of biogeography and ecology in diversification in this subgenus. The subgenus occurs in both temperate climates, in the north, and Mediterranean climates, in the southern part of its range. She presented a poster at Botany 2019, “Investigating speciation of *Iris* subgenus *Xiphium* through phylogenomics with a biogeographic focus,” on the hypothesized origin of the subgenus and diversification across its range. She found that several soil and climatic parameters are significantly correlated with species identity. This research experience convinced Zoe to seek a career path that includes a research component and she is currently considering the field of neurobiology.

Michael, a native of the South Bay,

(Continued on page 4)

stories over the years. Nonetheless, many taxa have not been seen for 50+ years and are unlikely to be found again, especially those that experienced destruction of their habitat. Another basic problem with documenting extinction is whether or not a presumed-extinct taxon warranted taxonomic recognition in the first place. This problem, when it arises, is one that systematic botanists need to resolve and one of the roles that herbarium scientists are especially well positioned to fill.

A 2018 analysis of California vascular plant extinction by Marcel Rejmánek (UC Davis) indicated that all Californian native taxa now presumed to be globally extinct were endemic to the Mediterranean-like California Floristic Province and most were narrowly endemic (known from one or two counties) and occurred at lower elevations (less than 500(–900) meters), with nearly a quarter of the taxa from wetland habitats. In other words, these lost plants were especially vulnerable to human activities such as urbanization, agriculture, and other types of habitat disruption. A subsequent analysis of vascular plant extinction throughout North America north of Mexico was recently submitted for publication by Wesley Knapp (North Carolina Natural Heritage Program) and colleagues, including Jepson Herbarium botanists. That analysis showed that a



*Holotype of Potentilla uliginosa collected by Milo Baker in Cunningham Marsh, Sonoma County, June 26, 1947. UC963929.*

recent global-scale assessment of plant extinction seriously underestimated extinction in North America. Knapp et al. also found that the southwestern US (including California) has the highest tally of extinct North American plant taxa. California had by far the highest number and concentration of plant extinctions, amounting to ~0.5% of our native species, as noted earlier by Rejmánek. These findings are not surprising, in light of the exceptional diversity of narrow endemics and the

extent of land conversion and development in California.

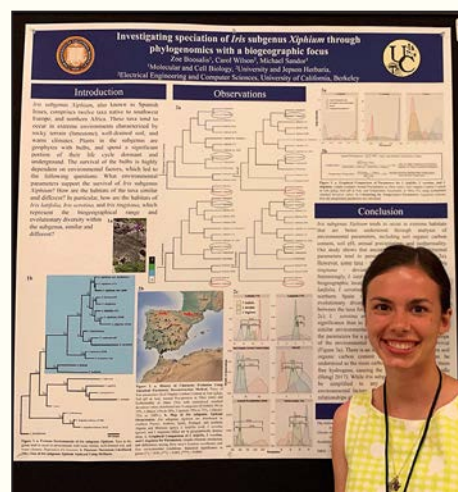
As noted by Knapp et al., the real situation is likely much more sobering than what these extinction numbers indicate. The rate of description of new-to-science plant taxa for California has not abated for over a century and most of these new taxa are endangered upon discovery or even presumed extinct, as in the case of *Potentilla uliginosa*, described by UC/JEPS botanist Barbara Ertter and her colleague Barry Johnston. Lack of detection or description of evolutionary lineages warranting taxonomic recognition in California has likely resulted in undocumented extinctions. Fine-grained systematic studies involving molecular phylogenetic components routinely result in discoveries of new diversity and too few studies have included sufficient sampling of populations and genes to resolve such diversity throughout our flora. Ongoing anthropogenic climate change, elevated impacts of invasive species with climate change, and continuing habitat fragmentation and degradation pose real dangers to continued survival of both described and undescribed plant diversity in our state. That said, we can all make an important difference in supporting and participating in conservation efforts, including basic research on understanding the full diversity of California plants! 🌱

(Continued from page 3)

joined the team in Spring 2019, his third year at UC Berkeley as a declared computer science major. Michael has been key in assisting with the large amount of sequence data generated for the phylogenetic study and also with mapping and statistical analyses for the ecological study. Carol, Zoe, and Michael are currently completing final analyses for both studies with a target date for submission of both manuscripts to peer-reviewed journals by the end of summer 2020. Both Zoe and Michael

are in Edinburgh this spring in a semester abroad program. Carol is pleased to report that Michael has been keeping her informed about the emergence of *Iris* at the Royal Botanic Garden in Edinburgh. 🌱

Zoe presented a poster at Botany 2019, "Investigating speciation of *Iris* subgenus *Xiphium* through phylogenomics with a biogeographic focus."





## Distinguished scholars visit the Silva Center for Phycological Documentation to study invasive seaweeds from the Galapagos Islands.

By Kathy Ann Miller

For three weeks in November-December 2019, the Silva Center for Phycological Documentation was honored to host two guests: Dr. Maria Altamirano Jeschke, a phycologist from the University of Malaga, Spain, and a specialist in invasive seaweeds; and Dr. Inti Keith, Senior Marine Biologist at the Charles Darwin Research Station, where she leads the Marine Invasive Species Program and the long-term Subtidal Ecological Monitoring Project in the Galapagos Marine Reserve (GMR).

Invasive species are a subject of concern in most oceans. Non-native seaweeds have the potential to compete with indigenous species and alter community structure. The question of invasive species in the Galapagos is especially intense, not only because of the possible threat to iconic and unique marine communities, but because the native seaweed flora is so poorly known. Who is native – and who is not?

Maria and Inti came to the Herbarium to study our extensive collection of seaweeds from the Galapagos. We house specimens from the Hopkins Expedition, (1899), the Templeton Crocker Expedition (1932), the Allan Hancock

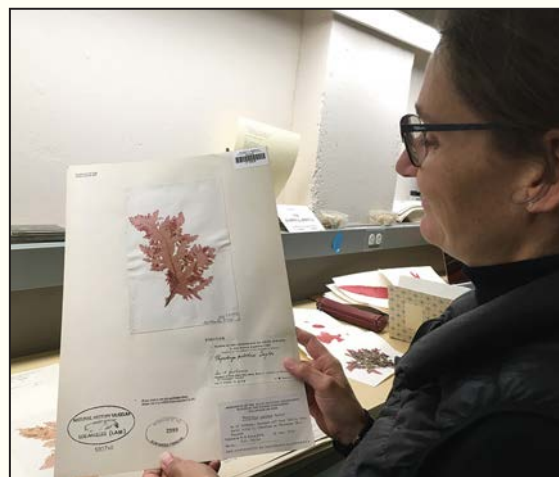
Expedition (1934), and those collected by Drs. E. Yale Dawson (1962), Paul C. Silva and Sylvia Earle (1966), and Kathy Ann Miller (2004), filling more than two full herbarium cases. This represents the largest collection of Galapagos seaweeds, in time and space, in the world.

Maria and Inti brought their own specimens to compare with ours, and we were able to identify most of them.

It was clear that many species have yet to be described, and that species that we “know”

need further study. They are particularly interested in *Asparagopsis*, a red algal genus, and *Caulerpa*, a green algal genus, both of which are aggressive invaders in other parts of the world and are conspicuous at sites in the Galapagos.

The purpose of our collaboration is: 1. To collect specimens from sites that have not been explored; 2. To use molecular methods to characterize species; 3. To determine which species are endemic (restricted to) the Galapagos Islands, and to establish a working list of Galapagos seaweeds; 4. To estimate the distribution of species throughout



Dr. Maria Altamirano Jeschke. Photo by Dr. Kathy Ann Miller.

the islands; 5. To identify species that exhibit traits of invasive species (recent spread, strong competitors, changing communities).

As the Curator of Algae at UC, I'm extremely glad to have such talented and dedicated friends studying our important specimens. I will make sure that all of our Galapagos seaweeds are mounted, imaged, and accessioned to our specimen database so that they may be shared with the growing number of scientists interested in studying the seaweed flora of the Galapagos. 📷

### *The Silva Center for Phycological Documentation*

The Silva Center is supported by an endowment fund established by Paul C. Silva. Paul's gift reflects his lifelong commitment to the study of marine algae and the endowment fund he established ensures that this important work will continue in perpetuity.

To learn more about the Silva Center, please visit:

[ucjeps.berkeley.edu/CPD/algal\\_research.html](http://ucjeps.berkeley.edu/CPD/algal_research.html)

and to directly support this project, see:

[give.berkeley.edu/fund/?f=FH5992000](http://give.berkeley.edu/fund/?f=FH5992000).



Dr. Inti Keith and Dr. Kathy Ann Miller. Photo by Dr. Maria Altamirano Jeschke

## Endowment funds provide key support for collections and research

The endowment funds of the University and Jepson Herbaria provide critical support for our operations and programs. Below we feature two different types of work that are supported by endowment funds. As state funding declines and private giving becomes an increasingly larger portion of the herbaria's budget, endowment support will help sustain the collections and programs of the herbaria.

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### The Lawrence R. Heckard Fund



*Perityle emoryi* in the Mecca Hills, Sonoran Desert. Photo by Susan Fawcett.



Isaac Marck studying *Perityle emoryi* on Santa Cruz Island. Photo by Sophia Winitzky.

The Lawrence R. Heckard Fund of the Jepson Herbarium was established with a generous bequest from Larry Heckard, former Curator of the Jepson Herbarium. The program supports systematic research on vascular plants (tracheophytes) of California and their close relatives in North America. This year, Isaac Marck received an award to investigate speciation in the *Perityle emoryi* species complex in the desert and Channel Islands of California. Isaac's research will inform the conservation management of rare and understudied members of *Perityle*, including possibly unique lineages endemic to California and worthy of taxonomic recognition. Furthermore, his research will produce new insights into the origins of the California flora.

More than a dozen plant species show coastal-desert disjunctions in their distributions, where populations are found on the immediate south-coast and Channel Islands of California, as well as in the low Colorado

Desert around Anza-Borrego, but are absent from the habitats that separate these far flung ecosystems. Botanists have long recognized that the gravel and dune ecosystems along the coast and on the Channel Islands share ecological conditions for plant growth and floristic elements with the deserts, but, so far, no studies have looked at the origin of these disjunctions from a phylogenetic perspective. *Perityle emoryi* is one of the most abundant annuals in the show-stopping spring wildflower blooms in the low desert in California, and it also occurs along the south coast and Channel Islands, but not in the Transverse and Peninsular ranges which separate the deserts from the coast. Isaac will be collecting *P. emoryi* from populations in the desert and coast of southern California, as well as Baja California, and using a molecular phylogenetic approach to test for cryptic speciation between desert and coastal populations and to understand how this disjunction arose. 📍

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### Alan R. Smith Fern Research and Curation Fund

In 2017, Alan Smith and his wife Joan established an endowment fund to support research in fern and lycophyte systematics and evolution. This gift was motivated by their desire to provide support for the institution and collection where Alan worked from 1969 until he retired in 2007. During his tenure, Alan amassed a significant fern collection, which is now the most important and best curated collection at a public university in this country.

Since Alan's retirement, Carl Rothfels has been actively building the program and is currently the lead Principal Investigator on a National Science Foundation award that will digitize 1.76 million herbarium and fossil pteridophyte specimens. To support that effort, endowment funds were used to hire an undergraduate student to help mount and accession hundreds of fern specimens from South America. 📍



Roya Banan, pictured above, was a great part of the UC/JEPS team and we thank her for all of her hard work!

## Jepson eFlora Revision 7

Revision 7 involves treatments that have changed taxonomically (e.g., taxa added or deleted) since Revision 6 of the *Jepson eFlora*. A summary of the changes incorporated in the *eFlora* is presented below and online ([ucjeps.berkeley.edu/eflora/supplement\\_summary.html#rev7](http://ucjeps.berkeley.edu/eflora/supplement_summary.html#rev7)).



*Brodiaea rosea* subsp. *vallicola*.  
Photo by Rob Preston.



*Brodiaea matsonii*.  
Photo by Rob Preston.



*Brodiaea matsonii*.  
Photo by Rob Preston.

### Asteraceae:

*Acroptilon* transferred to *Rhaponticum*.

*Acroptilon repens* changed to *Rhaponticum repens*, leaving no *Acroptilon* in California (or elsewhere).

*Parthenium hysterophorus* added, as naturalized.

*Volutaria tubuliflora* added, as naturalized, replacing *Volutaria canariensis*, misapplied.

### Cactaceae:

*Opuntia* ×*charlestonensis* added, as native.

*Opuntia curvispina* added, as native.

### Ebenaceae:

*Diospyros virginiana* added, as naturalized.

### Linderniaceae:

*Lindernia* transferred to Linderniaceae from Plantaginaceae.

### Nyctaginaceae:

*Boerhavia coulteri* var. *coulteri* added, as native.

### Poaceae:

*Bromus madritensis* subsp. *madritensis* recognized at species rank as *Bromus madritensis*.

*Bromus madritensis* subsp. *rubens* recognized at species rank as *Bromus rubens*.

*Bromus carinatus* recognized at varietal rank as *Bromus sitchensis* var. *carinatus*.

*Bromus marginatus* recognized at varietal rank as *Bromus sitchensis* var. *marginatus*.

*Bromus maritimus* recognized at varietal rank as *Bromus sitchensis* var. *maritimus*.

*Bromus polyanthus* recognized at varietal rank as *Bromus sitchensis* var. *polyanthus*.

*Bromus sitchensis* recognized at varietal rank as *Bromus sitchensis* var. *sitchensis*.

### Themidaceae:

*Brodiaea matsonii* newly described, as native.

*Brodiaea rosea* subsp. *rosea* recognized, as native.

*Brodiaea rosea* subsp. *vallicola* newly described, as native.

*Dichelostemma capitatum* changed to *Dipterostemon capitatus*, as native.

*Dichelostemma capitatum* subsp. *capitatum* changed to *Dipterostemon capitatus* subsp. *capitatus*, as native.

*Dipterostemon capitatus* subsp. *lacuna-vernalis* recognized, as native. [synonym

*Dichelostemma capitatum* subsp. *lacuna-vernalis*, previously treated as a synonym of *Dichelostemma capitatum* subsp. *capitatum*].

*Dichelostemma capitatum* subsp. *pauciflorum* changed to *Dipterostemon capitatus* subsp. *pauciflorus*, as native.



## Staff Updates on the Workshop Program



Join us as we welcome  
Quinn Winter Greenlon  
to the Herbarium Community!

Allyson Greenlon, our Public Programs Coordinator, is taking a break from the Jepson Workshops as she and her partner Alex bond with their sweet new baby for the next few months. Quinn was born at home on December 9, 2019. Weighing in at 7 pounds and just shy of 20 inches, he will be ready to botanize in no time!

During their parental leave, the Greenlon family took an adventurous cross-country road trip through the Southwest, sleeping in their van on their way to New Orleans. They are certainly keeping busy together until Allyson comes back to the workshop program. 🐾

## Introducing our New Staff Member – Sophia Winitsky

Sophia Winitsky has joined the Jepson Herbarium as the Field Coordinator of the Jepson Workshop Series for the 2020 season. Sophia grew up in Los Angeles, where she had little exposure to wild plants but learned to garden and appreciate plants at an early age. Throughout high school, she ventured farther into the botanical world and she spent her free time hiking, camping, and volunteering at local botanic gardens.

For her undergraduate degree, Sophia moved to North Carolina to attend Warren Wilson College, where she studied Environmental Education with an emphasis on food systems, hoping to return to Los Angeles with a greater understanding of food justice. During her undergraduate education she spent a semester in Belém, Brazil, studying Amazon Resource Management and a semester in Oakland growing food with The People's Grocery. She also studied Appalachian weaving, dyeing, and ethnobotany while in college and has always kept textile exploration as a

creative outlet.

Sophia moved back to Los Angeles and began working for the Model Neighborhood Program, a non-profit designed to bring fresh food to the LAUSD school system and run affordable farmer's markets in underserved communities. She spent three years working in urban food systems, until she realized she had lost connection to her original love: the plants themselves.

This propelled her towards botany and she moved to Bishop to study sagebrush recruitment with the Inyo National Forest. She continued researching the Great Basin flora while a student at Rancho Santa Ana Botanic, where she wrote "A Vascular Flora of Adobe Valley and Surrounding Hills, Mono County." After receiving her M.S., she worked in the Vegetation Program at the California Native Plant Society, mapping vegetation types throughout the state.

Most recently, she spent two months studying the flora of Baja

California, documenting plants for an interdisciplinary biosurvey of San Basilio, searching for rare and endemic genera of the peninsula, and collecting *Perityle* with Isaac Marck (along with surfing, snorkeling, and beach camping.) 🐾



*Sophie with Alan (mule) and Rio (dog) on their way up a mountain to document the plants of a dry lakebed, Baja California Sur. Photo by Isaac Marck.*



## Bier Kraichak receives Thailand's 2019 Young Scientist Award

Assistant Professor Dr. Ekaphan (Bier) Kraichak, an alumnus from Brent Mishler's lab, has been awarded a prestigious award – Thailand's 2019 Young Scientist Award – for his outstanding achievement as a scientist under thirty-five. He was presented with a cash prize and the award by Thailand's Princess Maha Chakri Sirindhorn at a formal ceremony attended by dignitaries such as the Minister of Higher Education, Science and Innovation (see photo).


Before coming to UC Berkeley, Bier Kraichak received a bachelor's degree in biology with honors from Bowdoin College in Maine. In 2008, he joined the University and Jepson Herbaria and the Department of Integrative Biology as a Ph.D. student under

the supervision of Dr. Brent Mishler. Bier's Ph.D. dissertation focused on the ecology and evolution of a peculiar group of tropical bryophytes that grow on leaves, so-called epiphyllous bryophytes. After his Ph.D., he completed postdoctoral work on lichen systematics



*Bier receives the award from Thailand's Princess Maha Chakri Sirindhorn.*

at the Field Museum, Chicago. He is now an assistant professor of Botany at Kasetsart University, where he is working on a variety of topics ranging from taxonomy and biodiversity, to ecology and evolution of bryophytes and lichens in Thailand, using phylogenetic and statistical approaches to answer fundamental questions in botany.

Bier has published more than 40 peer-reviewed articles and serves as an associate editor for *MycoKeys*, as well as an ad-hoc reviewer for 18 international journals. He has also received the Outstanding Publication Award in 2017 and the Outstanding Instructor Award in 2018 from the Faculty of Science, Kasetsart University. 

## Jepson Manual illustrations used for new living wall installation

The resources of the Jepson Herbarium are used for a wide variety of projects including other botanical databases (CNPS Inventory of Rare and Endangered Plants, Cal-IPC Weed Mapper, & BONAP), web sites and online platforms (Calflora & Calscape), art books and installations, and academic research by scientists from around the globe. We share specimen data, geographic localities, archive material, and illustrations from the second edition of *The Jepson Manual* (TJM2).

This past summer, we shared il-




*Helianthus bolanderi*

lustrations from TJM2 with Miridae, a landscape architecture design-build company based in Sacramento that creates habitat for native plants and the wildlife they support. Guided by science and committed to using high-quality construction, they create landscapes that are beautiful, resilient, and ecologically significant. In response to



*Photo by Kai Skye.*

a call for a "living wall" in the lobby of a national construction company's regional headquarters, Miridae designed a "Seed Bank" in the form of a living wall installation that displays illustrations of plants and uses actual seeds from the broader Sacramento area. They used the illustrations from TJM2 to design the wall. The image shows the artistic renderings of the Jepson illustrations, beginning with *Helianthus bolanderi* and *Croton setiger* (first and second images from the left).

For more information about using the resources of the Jepson Herbarium in your project, please contact Staci Markos ([smarkos@berkeley.edu](mailto:smarkos@berkeley.edu)). 



*Croton setiger*

## MEMORIAL, HONORIFIC, AND ENDOWMENT GIFTS

***In Memory of Larry Abers***

Britt Thorsnes

***In Memory of***

***Dr. Herbert & Irene Baker***

Ed Guerrant

***In Memory of James C. Hickman***

Carole S. Hickman

***In Memory of Tim Lukaszewski***

Dmitri Belser, Barbara Cottrell, Maryann Donofrio, Thomas Farley, Jane Hoffman & Jill Strachan, Jean Jacob, M. Gunnar & Marcella Madsen, Brooke Maury, Joan Neveu, David Ogden, and James Sibbring

***In Memory of***

***William and Genevieve Sattler***

Alfred & Barbara Sattler

***In Memory of Susan M. Smith***

Alison Moëd Paolercio

***Bryophyte Curation Fund***

William & Glennie Doyle, Brent Mishler, and Paul Wilson

***Library and Archives***

William Doyle and Richard O'Donnell

***Silva Center for***

***Phycological Documentation***

Sun Ming Boo, Susan Brawley, Kathy Ann Miller, Robert Schmieder, and John A. West

***Herbaria Futures Endowment***

Beth Lowe Corbin, Paula & Ethan Dawson, and Jan Nachlinger

***Rudolf Schmid Endowment Fund***

Rudolf Schmid

***Alan R. Smith Fern Research and Curation Fund***

Beth Alexander, Tom Lemieux, Dana Luis, and Alan & Joan Smith

### SUPPORT THE HERBARIA

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(Continued from page 1)

major American political, economic, technological, and social developments over Lemmon's long and interesting life.

The story begins in 1832 and describes John's family history and upbringing. After years of being a schoolmaster, John Gill Lemmon, an ardent abolitionist, joined the Michigan 4th Cavalry (in 1862) and served in General Sherman's campaign on Atlanta. While in Georgia, Lemmon was captured by Rebels and was sent by train to Andersonville. When Union forces threatened to take the prison, Lemmon was transferred to another stockade at Florence, South Carolina. His harrowing descriptions of disease, brutality, starvation, and despair provide a vivid account of life inside the prisons.

Weighing less than 100 pounds when finally liberated in March of 1865, Lemmon never fully recovered physically or emotionally. His Michigan family suspected he would never survive a northern winter, so sent him by ship to join his elder brothers in Sierra Valley in northeastern California. The older Lemmons had arrived in the Sierra during the Gold Rush of 1849.

A few months after his arrival in California, the emaciated veteran began writing accounts of his wartime experiences, which appeared in the *Quincy Plumas National*, *Marysville Daily Appeal*, the *Downieville Mountain Messenger*, and other area newspapers.

Interested in botany since boyhood, Lemmon's focus on the horrors he had experienced during the war was

diverted by the unfamiliar plants he found in the High Sierra valley. Sierra Valley's explosion of floral color in the spring of 1867 rekindled an interest that evolved into a life's work.

For more than a decade, Lemmon explored the valleys, mountains, and deserts of northeastern California and western Nevada in quest of plants unknown to science. His interest at-




*Lemmon's paintbrush, Castilleja lemmonii, is one of the first specimens Lemmon sent to Asa Gray at Harvard while Lemmon was recovering from his incarceration at prisoner of war camps during the Civil War.*

tracted the attention of the nation's premier botanists, Harvard professor Asa Gray, German-born George Engelmann, and other leaders in the profession.

By 1880, Lemmon had relocated to Oakland and married Sara Plummer, who shared his interest in botany. Mount Lemmon overlooking Tucson, Arizona, which the Lemmons climbed on their botanizing honeymoon, was named for Sara, the first white woman to reach the summit. She also led the crusade to designate the

California Poppy as the state flower of California. An engraving of the flower graces the headstone on their graves.

Despite demons spawned by the Civil War, by the end of the 19th century, Lemmon and his wife had become the best-known botanists in California, according to Dr. Willis Jepson. Some of the books and pamphlets Lemmon wrote, particularly about the forests of California, remain in print, and many of the plants he and his wife discovered bear their names.

For more information about the book, search for John Gill Lemmon on the *Amazon.com* website. Part of the book can be read online. 

## JEPSON HERBARIUM RESOURCES & PROJECTS RELATED TO THE CALIFORNIA FLORA

The Jepson Herbarium includes approximately 400,000 plant specimens from California.

**Director:** Brent D. Mishler  
California Phylodiversity Project  
Systematics and ecology of *Syntrichia*

**Jepson Curator:** Bruce G. Baldwin  
*Jepson eFlora*

Systematics and evolution of Calif. tarweeds and relatives (tribe Madieae, Compositae), *Chaenactis* (Chaenactidiaceae, Compositae), and *Collinsia* (Plantaginaceae).

**Curator of Ferns and Lycophytes:**  
Carl Rothfels

Divergence and hybridization in Californian ferns and lycophytes (especially *Notholaena*, *Cystopteris*, *Isoetes*).

**Curator of W. N. American Botany:**  
Barbara Ertter, *Flora of Mount Diablo* and flora of the East Bay, North American Potentilleae

**Asst. Director for Development & Outreach, and *Globe* editor:** Staci Markos

**Biodiversity Informatics Manager:**  
Jason Alexander

**Collections Staff & Plant Identification:** Kim Kersh, Ana Penny, and Margriet Wetherwax

**Archivist and Librarian:** Amy Kasameyer

**Public Programs:** Allyson Greenlon, Sophia Winitzky

**Membership, workshop enrollment, and *Globe* design:** Roxanne Andersen

**Staff Research Associate:** Bridget Wessa

**Jepson Videos:** Staci Markos, Allyson Greenlon, Amy Kasameyer

### Trustees:

Vice Chancellor Emeritus Beth Burnside; Professor Emeritus Russell Jones; Professor Emeritus John Taylor and Professor Brent D. Mishler (ex officio)

**Constancea:** UC Publications in Botany (online)



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## COVID-19 Update

In response to the rapidly changing environment around COVID-19, the Jepson Workshop program has been actively rescheduling our spring workshops. As we are able to confirm these new dates, we are updating our web site and communicating directly with participants that have already enrolled in workshops. At this time, we have not made decisions about classes scheduled for late May and beyond; we will continue to follow recommendations from UC Berkeley and the CDC and will communicate with participants as new decisions are made.

We are committed to doing all we can to support our wonderful community of workshop instructors and participants and we hope to continue with the 2020 season as best we can. Thank you all for your patience during this unprecedented time and please feel free to contact us with questions.

## Save the Date!

*Friends of the Jepson Herbarium*

# 2020 Members' Night

**Saturday, October 17, 2020**

*Keynote Speaker:*

Brent D. Mishler

Director, University and Jepson Herbaria

*"New phylogenetic approaches to assessing  
California floristic diversity, endemism,  
and conservation priorities."*

A Jepson Workshop is being offered on this topic  
the same day if you want to dig into the details:

[ucjeps.berkeley.edu/workshops/](http://ucjeps.berkeley.edu/workshops/)