

## Summer interns in botany gain mentor-guided experience

Contributions from Gary Krupnick, Laurence Dorr, Erika Gardner, Rose Gullledge, Alice Tangerini, Jun Wen, Kenneth Wurdack, and Robert Costello

While the COVID-19 pandemic resulted in quiet hallways and empty offices, the return to the office has led to in-person activity. The summer months are a conundrum—some staff travel to international conferences and field expeditions, but new voices fill the herbarium as a new crop of interns and volunteers make their presence known. The summer of 2023 was no exception, with a handful of eager individuals learning and contributing to science in the Department of Botany. Here we present an overview of the fresh faces that visited this summer for training and research.

The Natural History Research Experiences (NHRE) is a 10-week summer research internship program for undergraduates at the National Museum of Natural History funded by the National Science Foundation. From May 30 to August 4, Botany hosted two NHRE interns, **Jillian Cieslik** and **Luke Sparreo**. NHRE interns work closely with scientific mentors on independent research projects. Project results were presented at a poster session for NMNH staff, as well as during a public outreach day in the exhibit halls, and the results are being prepared for publication.

**Kenneth Wurdack** and **Larry Dorr** mentored **Jillian Cieslik**, a senior at Ball State University (Indiana) with interests in plant microbiology and genetics. Her project, “Establishing phylogenetic relationships and distinctions of the North American *Lindera*,” was to sort out a complex of native spice bushes using molecular techniques. She examined relationships among North American spicebushes (three species of *Lindera* and two species of *Litsea*; Laura-

*Continued on page 2*

**Ten eager individuals gained experience and contributed to science in the Department of Botany during the summer of 2023.**

## Interns

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ceae), with a special emphasis on species delimitation in the bog spicebush, *Lindera subcoriacea*, a rare southeastern USA wetland species, which has been considered questionably distinct from the widespread *Lindera benzoin*. Plastid genomes were assembled, and several nuclear genes were sequenced that resolved relationships of these species and confirmed that *L. subcoriacea* should be treated as a distinct species. Cieslik plans to continue her focus on Botany and attend graduate school next year.

**Jun Wen, Greg Stull, and Alicia Talavera** hosted NHRE intern **Luke Sparreo** from Connecticut College. Sparreo worked on the project "Discovering a new genus of the grape family Vitaceae and exploring tropical-temperate transition in plants." This project focused on a potential new plant genus, *Neoampelocissus*, and its rela-



Larry Dorr, intern Jillian Cieslik, and Kenneth Wurdack with *Lindera* specimens in the herbarium. (photo by Smithsonian Institution)



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Chair of Botany  
Eric Schuettpelz  
(schuettpelze@si.edu)

#### EDITORIAL STAFF

Editor  
Gary Krupnick  
(krupnick@si.edu)

Copy Editors  
Robin Everly and Rose Gullledge

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One the cover: *Phlox pilosa*, as seen in Smithsonian Garden's "Pollinator Garden" at the National Museum of Natural History. (photo by intern Jillian Vallance)

tionship with other genera in the grape plant family, Vitaceae. The phylogenomic results from the study show that the *Neoampelocissus* group is sister to the grape genus *Vitis* rather than the genus *Ampelocissus*, where the small group of c. six species of Neotropical *Ampelocissus* species have been placed. The *Neoampelocissus* group is found in tropical regions of Central America, while most species of its likely sister group, *Vitis*, occur in the north temperate regions. DNAs of *Neoampelocissus* species from silica gel preserved samples and herbarium specimens were sequenced using the target enrichment approach, targeting 1013 nuclear genes. The newly generated sequence data were compared with previously analyzed species of the grape family to place the new genus into a greater phylogeny. Seeds of *Neoampelocissus* and its close allies were imaged microscopically and measured for 14 diagnostic characteristics to add a morphological component to the project. The results support a New World origin for the *Neoampelocissus* – *Vitis* group, involving a tropical-temperate transition for the temperate radiations of the grape genus *Vitis*. Sparreo will apply for graduate school in Botany soon.

Smithsonian Affiliations, in collabo-

ration with the Emerson Collective, onboarded and recruited 100 undergraduate students from all over the United States to participate in an eight-week Summer



Natural History Research Experiences (NHRE) intern Luke Sparreo of Connecticut College collecting *Vitis simpsonii* (Sparreo #1) on Plummers Island. (photo by J. Wen).



**The 2023 Leadership for Change interns (left to right): Jillian Vallance, Anita Patane, Kelsea Saulny, and Jaylynn Rutledge. (photo by Erika Gardner)**

Leadership for Change internship. Of those selected, 50 were stationed in Washington, DC and of those 50, four were supervised in the Department of Botany by **Erika Gardner**. During their eight-week internship, the DC interns received full accommodation and a stipend. Gardner provided basic botany training and oversaw the various projects assigned to each intern.

**Jaylynn Rutledge** (North Carolina A&T State University) and **Kelsea Saulny** (Virginia State University) worked as a pair to update the museum's West Wing 5<sup>th</sup> floor entryway lobby display cases. They produced content and used specimens based around Jonathan Amith's Puebla, Mexico, project. **Anita Patane** (University of Northern Colorado) researched the origin of the Plantlife Survival cards developed by the Naval Training Equipment Center and wrote an article for the department. **Jillian Vallance** (University of Colorado, Boulder) wrote

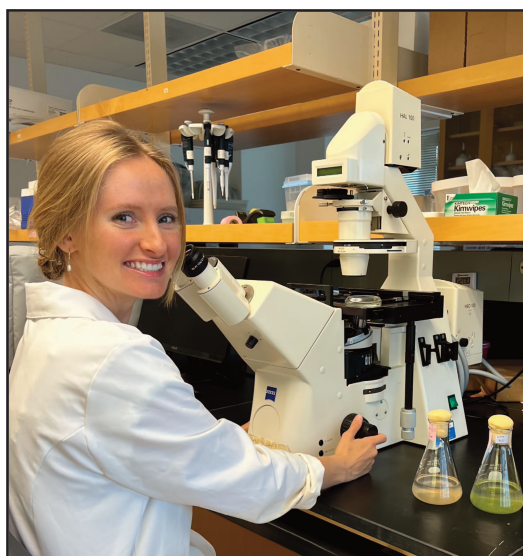
an article for the *Plant Press* about how to properly donate specimens to the U.S. National Herbarium. She also prepared specimens acquired from Three Mile Island using archival methods.

All four Summer Leadership for Change interns visited the Smithsonian's

Museum Support Center in Suitland, Maryland, where they helped process 3,578 specimens collected by Jonathan Amith. The Smithsonian Affiliations office provided additional online enrichments presented by Smithsonian staff and program partners. These enrichments provided practical career information and exposure to various professionals.

**Savannah Mapes**, a fourth year PhD student at the Virginia Institute of Marine Science (VIMS), worked this summer on dinoflagellate and harmful algal bloom (HAB) research. Under the mentorship of **Rose Gulledge**, she worked on Maria Faust's legacy material, perusing her lab notes, SEM micrographs, and publications. Much of Faust's work applies to Mapes' research in HABs; her taxonomic reviews and guides are heavily in use in the classroom as well as in the lab. Mapes also shared research on HABs and phytoplankton at an Expert Is In session in the museum's Ocean Hall on June 16. She talked about the important role these tiny organisms play in our everyday lives and showcased the ecological and financial impact of HABs. As a graduate student, she is examining the dynamics of HAB species in the lower Chesapeake Bay, collecting data that can be used in the development of enhanced monitoring and mitigation strategies. Some of her work is focused specifically on characterizing a local toxin-producing and bioluminescent HAB species, *Alexandrium monilatum*. She hopes to uncover clues in the life stages to

*Continued on page 4*



**Interns Savannah Mapes (left) and Erin Ellis (right). (photos by R. Gulledge and A. Tangerini)**

## Interns

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determine why this species creates harmful blooms.

From late-September to early-October, intern **Erin Ellis** worked on the Botanical Art Collection inventory with **Alice Tangerini**. Ellis is completing a California State University at Monterey Bay graduate Certificate in Natural Science Illustration. Her expertise in Adobe Photoshop was imperative for Tangerini and they shared techniques of working with the program. Ellis scanned botanical illustrations and manipulated them in Photoshop for the best image quality to be uploaded into EMu, the museum's collections management program. Many illustrations had not been located previously but discovered in the offices of retired curators and other recently vacated offices. Some projects included scanning all of the originals of Floyd McClure's "The Bamboos" book, many of the illustrations from Pedro Acevedo's Sapindaceae treatment, and a large number of Cathy Pasquale illustrations of Acanthaceae completed for Dieter Wasshausen.

Tangerini also has a volunteer illustrator, **James Morrison**, working on Fridays throughout October. Morrison is a volunteer illustrator in the Fossil Lab under Abby Telfer's sponsorship and had requested to work with Botany's illustration collections. Like Ellis, Morrison has a background in working with Adobe Graphic software and is also scanning illustrations for the Botanical Art Collection.

During the spring and summer months, interns **Eva Hirsch** and **Maya Williams** worked together on analyzing data for PolliNation DC, a multi-project initiative to engage students and the public in documenting pollinator-plant interactions in order to rank the importance of native plants for pollinators. The PolliNation DC initiative is headed by **Robert Costello** (NMNH Office of Education, Outreach, and Visitor Experience; EOVE) and **Gary Krupnick** (NMNH Botany). Evaluating the data of about 3,000 observations from 55 gardens, the interns identified all the flowering plants associated with pollinators in community gardens across the Washington DC region. They analyzed



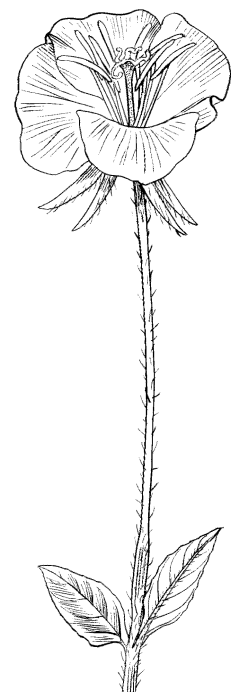
**Robert Costello** (NMNH Office of Education, Outreach, and Visitor Experience) with intern **Eva Hirsch**, volunteer **Kristen Charlery**, and intern **Mya Williams** at the Bee Lab at USGS Patuxent Wildlife Research Center in Laurel, Maryland. (photo by R. Costello)

1,600 observations and recorded the relative frequency of interaction for six species of bumble bees across 46 species of plants. The interns learned how to do bumble bee surveys around the National Mall to document which plants were in bloom, and of those plants, which were being used by bumble bees. Volunteer **Kristen Charlery**, a Master Naturalist attending the University of the District of Columbia, was also trained in conducting bumble bee surveys.

Hirsch also built a beta project on Zooniverse for another aspect within PolliNation DC, *Science for Bumble Bees*. The Zooniverse project is a crowdsourcing site to process time-lapse photography of bees visiting flowers. The photos will be taken by students at schools with gardens, and the pollinating animals will be classified by the public on Zooniverse. Overall, the interns learned to identify plants and pollinators, conducted protocols for bee surveys, appreciated the importance of habitat restoration, and gained knowledge of data collection, analysis, and crowdsourcing. Hirsch intends to apply to Ph.D. programs in environmental education and is currently on contract in EOVE to develop a guide to implementing *Science for Bumble Bees*.

Charlery intends to pursue a master's degree in a field of environmental studies. Williams is now in a master's program in biology at American University.

This summer was refreshing in terms of having new people working and learning among the Botany staff. The Department of Botany wishes the best of luck to these wonderful interns in their future endeavors.



## Save the Date

### **21<sup>st</sup> Smithsonian Botanical Symposium to be held on 17 May 2024**

The Smithsonian National Museum of Natural History Department of Botany, the United States Botanic Garden, and Smithsonian Gardens will hold the 21<sup>st</sup> Smithsonian Botanical Symposium, “Advancing Plant Conservation Through Horticulture,” on 17 May 2024. The focus of the Symposium will be on conservation horticulture, the application of the technical knowledge and practical expertise of growing plants (horticulture) for the advancement of plant conservation. Conservation horticulture is critical in our time of rapid global change if we are to ensure the survival of imperiled plant species. Botanic gardens and conservation organizations around the world maintain diverse and wild-collected ex situ plant collections, care for plants of conservation concern in situ, provide

plants for population augmentation and repopulation, and supporting conservation education and advocacy. Many plants that are extinct or facing extinction in the wild persist in cultivation through such efforts. The 21<sup>st</sup> Smithsonian Botanical Symposium will explore these topics and current research on the nexus of plant conservation and horticulture.

The Symposium will be a hybrid event, with invited speakers giving afternoon presentations for in-person and virtual guests in Baird Auditorium of the National Museum of Natural History, and a poster session and evening reception for in-person

guests in the Conservatory of the U.S. Botanic Garden.

In addition, the 21<sup>st</sup> José Cuatrecasas Medal for Excellence in Tropical Botany will be awarded at the Symposium to an international scholar who has contributed significantly to advancing the field of tropical botany. The award is named in honor of Dr. José Cuatrecasas, a pioneering botanist who spent many years working in the Department of Botany at the Smithsonian and devoted his career to plant exploration and taxonomy in tropical South America.



## **GREENHOUSE UPDATE**



A recent view (20 September 2023) of the new Botany Research Greenhouse range under construction at the Smithsonian Museum Support Center (MSC) in Suitland, Maryland. The greenhouse structure is complete with ongoing work on utilities and the headhouse. The expected completion date is January 2024. (photo by K. Wurdack)

# A guide to collecting plant specimens for the US National Herbarium

By Jillian Vallance

A specimen is a single plant that can be used as an example of a particular species to be examined by scientists, historians, and artists. Botanists collect specimens to assist in current research, aid in future research, or fill in a botanical blackhole. A botanical blackhole is when there is a location that is largely undocumented or unstudied.

Scientists are not the only ones who can collect specimens. Citizen scientists describe anyone collecting specimens in a non-professional capacity. They may collect to fill a gap in the botanic record, aid in research that is being conducted by a scientist, or for their own personal collection!

Citizen science is a great way to increase scientific knowledge and engage more of the public in the scientific community. If a citizen scientist has a collection of flora and they have received approval from the Department of Botany's collection manager, they are welcome to send their specimens to the Smithsonian to be mounted and added in the US National Herbarium. For the specimens to be accepted by the museum, the collector must have permission from the landowner to collect, must supply copies of permits, and must provide a formal signed and dated Deed of Gift. The plant should not be on any threatened, endangered, or rare list. Plant apps, such as SEEK and iNaturalist, can be used to obtain an identification in the field.

Please keep in mind the Smithsonian's botanical collection is exceptionally large and sending in a specimen does not guarantee it will be used for research immediately.

## Specimen collection: good practices

### Materials needed (Fig. 1):

- Pen
- Field notebook or paper
- Hand pruners or clippers
- Newspaper
- Plant press. Learn how to make your own: <<https://www.youtube.com/watch?v=IJZAalKfL4>>

**Step 1. Record the collection:** Once you find the plant you intend to collect, record your name, the date, anyone who accompanies you and a description of the plant (height, flower color, etc.), and specific details on the location in your field notebook. The description of the location needs to be detailed enough for someone to find it in the future; add any roads that may be nearby or special landmarks. If possible, identify the family, genus, and species of the sample collected. If multiple

plants are being collected, it is helpful to assign each intended specimen with a field number in your notes (Fig. 2).

**Step 2. Specimen collection:** Identify which portion of the plant would make the best specimen; you are looking for parts that express a variety of features of the plant. These parts include fruits, flowers, leaves, and root systems. Multiple collections may be required for a well-rounded specimen. Unless the plant occurs in great abundance in the area you are collecting, avoid cutting off portions of the plant that may affect the future health of the plant (Fig 3).

**Step 3. Arrange and press:** Clip your selected portion and arrange it between sheets of newspaper to feature the most diagnostic parts of the plant. The sample should fit on an herbarium sheet, which is

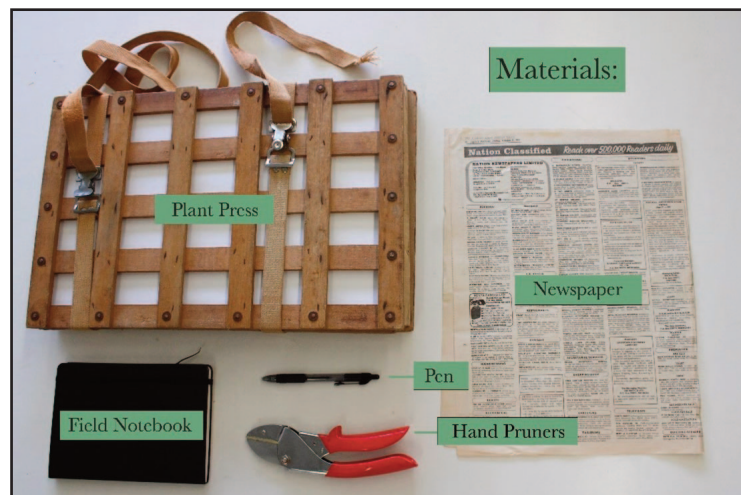


Fig. 1: Materials needed for plant collection.

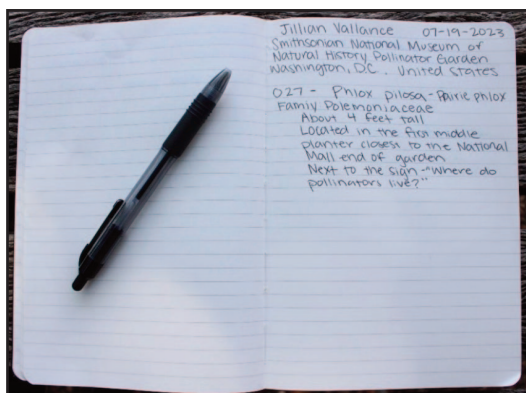


Fig. 2: Example of recording a sample collection in a field notebook.



Fig. 3: Capture every important feature of the plant.

11.5 inches x 16.5 inches. Use the plant press to secure the sheets of newspaper between layers of cardboard, flatten the plant, and write the plant's assigned field number on the newspaper. Once the collection is complete, place the plant press somewhere warm and dry, like a car. The plants will need a few days in the press to dry (Fig. 4).

**Step 4. Label and mount:** If you are planning to mount the specimen—or send it to the Smithsonian to be mounted—construct a label consisting of all the information about the plant recorded in your field notes. The label needs to be included with your specimen if you send it to the Smithsonian (Fig. 5).

For a personal collection, the plants can be mounted in any way the collector prefers. The Smithsonian mounting process uses specific protocols and archival materials to ensure the longevity of the specimen, which is why any specimens sent to the museum should be unmounted (Fig. 6).



**Fig. 4:** The sample should be able to fit on an herbarium paper and arranged so that the critical diagnostic characters are displayed.



**Fig. 5:** Each specimen needs a label containing specific details regarding the location and description.

## Preparing specimens for the Smithsonian – a checklist

- Identify an area that is either largely undocumented or botanically significant.
- Contact the Department of Botany's collection manager <USNH@si.edu> for permission to send specimens and to prepare the appropriate paperwork.
- Before collecting, verify the plant is not on any threatened, endangered, or rare list.
- Use best practices when collecting specimens of flora.
  - Get permission from the landowner to collect and keep copies of all applicable permits.
  - In a field notebook, record the collector(s) name, date, field location, and detailed plant description. Include coordinates, elevation, and accurate family identification, if possible.
  - Press the plant to feature as many aspects of the plant as possible. All components of the specimen will need to fit on a 11.5" x 16.5" herbarium sheet.
  - Let the sample dry inside the plant press for a couple of days, and ensure the press is kept dry and warm.
- Make a label to match each sample, this label should include:
  - Initial field identification to family, genus, or species, if possible.
  - Collector's name and whoever accompanied them.
  - Collection date.
  - Specific location of where the sample was collected, including coordinates and elevation, if possible.
  - Specimen description.
  - Field number if multiple specimens are collected to match the label to the sample.
- Specimens are ready to be sent to the Smithsonian only if the following are included:
  - Unmounted, completely dried specimens still in newspaper. If multiple specimens are included there needs to be an indication of assigned field number.
  - Completed labels for each sample.
  - Appropriate permits.
  - Deed of gift to the Smithsonian.
  - Itemized list of specimens sent for donation.



**Fig. 6:** Collections are mounted at the Smithsonian using archival materials to ensure the longevity of the specimen.

# Colonization influences worldwide distribution of plant specimens

-Adapted from *Florida State University News*

A recent study that was published in *Nature Human Behavior* (<https://doi.org/10.1038/s41562-023-01616-7>) shows how colonization has contributed to the distribution of plants specimens stored in herbaria collections around the world.

Plant diversity in nature is generally highest in tropical regions around the equator, with decreasing diversity closer to the poles. Xiao Feng (Florida State University), Daniel Park (Purdue University), and a team of more than 50 authors from 39 countries (including **Sylvia Orli** from Smithsonian's National Museum of Natural History) showed that the plant specimens housed in herbaria in Europe and North America are more comprehensive and diverse than the collections housed in the countries with more natural plant diversity.

By comparing modern finds with collection specimens, researchers can examine how a species has changed over time.

"People can't travel back in time to observe what plants look like 100 years ago, but herbaria collections give us a way to examine the past," Feng said. "If you're a researcher from Brazil, for example, and you want to study what native plants were like a century ago, you may have to travel to another country to examine certain species."

The researchers analyzed more than 85 million records from the Global Biodiversity Information Facility (GBIF) and surveyed herbaria collections from around the world to document the origins and destinations of specimens collected between 1600 and 2021.

Their data suggest that between 1600 to 1945, Europe and North America were responsible for the majority of intercontinental collecting activities, amassing large amounts of specimens from Africa, Asia and South America.

The trend mostly persisted in the era after World War II, when decolonization efforts increased and more countries in Africa and Asia gained autonomy. Despite the growth of collections in South America, Oceania and Asia, the discrepancy of biodiversity collections persists. The international collections by Europe and North

America continued to expand, and today they remain larger than those on other continents.

The discrepancy between where plant diversity exists in nature and where it is preserved and catalogued by scientists is a legacy of colonialism, the researchers said. The movement of plant specimens from the biodiverse tropics to temperate regions runs counter to the natural gradient of biodiversity, in which biodiversity increases as we move from polar to equatorial regions.

"Biodiversity is probably best studied where it occurs, and that's not what has happened historically," Park said. "A lot of the science that happens with these specimens is very globally relevant; however, as we note in our paper, the means of contributing to this science is not distributed globally, at least not yet."

Some efforts are underway to address the disparities in access. One way collections have become more accessible is through digitization — gathering data and images from specimens for storage and

sharing in a digital format. Regional, national, and international groups are improving databases and increasing the amount of digitized specimens shared online. One example is **iDigBio**, a project organized by Florida State University, University of Florida, and other institutions.

But digitization is still in its infancy, and there are many cases where access to physical specimens is necessary for the work researchers want to complete. Investments in infrastructure and training in previously colonized countries would also help to address disparities.

Park said acknowledging the role Indigenous people played in the collection and study of specimens and improving the information herbaria have about their plants is a good starting place. In many cases, herbaria don't have a full accounting of their collections. Understanding exactly how many items exist and their origin is key, he said.



***Theobroma cacao***, a tropical plant collected from Brazil in 1979, preserved in the collection of the U.S. National Herbarium in Washington, DC.

# ***Vickianthus*, a new genus of the Vernoniaeae (Compositae), chosen to honor Vicki Funk**

The sunflower family (Compositae) has the largest number of accepted species of any plant family, estimated to be between 25,000 to 30,000 in ca. 1,700 genera. Because of the size of the family and its complexity of flower structures, Compositae is divided into 45 tribes to reflect evolutionary relationships and shared characteristics. Harold Robinson and Sterling Keeley worked on one of the larger tribes in this family, Vernoniaeae. Morphologically diverse and globally distributed, this tribe comprises over 1,500 species with extensive distributions in both the Old and New Worlds. Coined as the “evil tribe” by Vicki Funk, this tribe has a continuum of overlapping morphological characters/states which makes it very difficult to resolve many of its systematic relationships.

Morphological work by Robinson and phylogenomic studies of Keeley in the past 40 years are only now beginning to tease apart this complicated “evil tribe” and provide a better understanding of the underlying morphological relationships within. With strong support from a recent molecular phylogenetic study of the Vernoniaeae across its entire geographical range by Keeley and the work by Robinson, ten

Mexican species of *Vernonia* and *Vernoniaanthura* were transferred to the new genus, *Vickianthus* in the newly released paper, “*Vickianthus*, a new genus of the Vernoniaeae (Compositae) from Mexico” by Harold Robinson†, Vicki A. Funk†, Carol L. Kelloff, and Raymund Chan, and is published in *Journal of the Botanical Research Institute of Texas* (<https://doi.org/10.17348/jbrit.v17.i1.1291>).

As Robinson states in the paper, “The name of the genus is chosen to honor the late Dr. Vicki Ann Funk (not Victoria), who was (and remains) a coauthor on the paper in spite of the present decision to name the genus for her”. Unfortunately, Robinson also passed away before the paper was finished, so to honor Robinson, the paper was completed in this present version by his co-authors.



Left: Vicki Funk collecting plants on Volcano Tacna, Chile, in 2014. (photo by Mauricio Diazgranados)

Right: A herbarium sheet showing *Vernonia alamanii* DC. (Mexico, Valle de Cenancingo, Lyonnet 552, January 1931) designated as the type species *Vickianthus alamanii* (DC.) H. Rob. for the new genus *Vickianthus* H. Rob.

## ForestGEO hosts 2023 annual analytical workshop in Panama

*After a three-year hiatus due to Covid-19, ForestGEO hosted an Annual Analytical Workshop this July in Gamboa, Panama. Participants from all over the globe came together to share their expertise and develop their research. Read on for a look inside 2023's workshop.*

This summer, 48 forest scientists from 24 countries gathered in Gamboa, Panama, to embark on a two-week-long workshop geared towards data analysis, training, and collaboration. The workshop was an opportunity for students and early-career scientists to learn from established leaders in the forest science field with the goal of fostering the next generation of outstanding forest dynamics researchers. Each participant submitted a research proposal during the application process, and the 14 days were spent intensively working on data analysis strategies and brainstorming research collaborations. Participants split into breakout groups based on their research topics: demography, ecosystems and biomass, mortality, and spatial ecology. Each group was led by two to four mentors, experienced scientists who volunteered their time to foster the growth of early-career researchers.

Days were dedicated to working within



**ForestGEO director, Stuart Davies, gives a welcome presentation at the 2023 workshop. (photo by Lauren Krizel)**

the breakout groups, followed by participant or mentor seminars in the evenings. On the last day of the workshop, each participant presented their project and summarized the progress they made over the course of the two weeks.

**Jose Medina-Vega**, a mentor of the spatial ecology group, and ForestGEO postdoc, shared more about his working group:

*Throughout the workshop, we engaged in an extensive exploration of thought-provoking inquiries, aiming to elucidate relationships. Our approach involved lively discussions on how to tackle various spatial ecological problems. Participants began by constructing maps and examining patterns, which greatly clarified a direction for their research.*



**Top left: the spatial ecology group hard at work. Bottom left: the demography group. Right side: the mortality group. (photos by Lauren Krizel, Daniel Zuleta, and Dinh Phuc Nguyen)**



**ForestGEO 2023 workshop participants and mentors at the final dinner. (photo by Daniel Zuleta)**

*By the end of the workshop, participants had made substantial progress in their projects. The collaborative approach in our breakout group proved to be a rewarding experience, advancing the research endeavors of all involved.*

Despite the long days, the workshop wasn't all work and no play! The group got a much-deserved break with a field trip to nearby Barro Colorado Island (BCI), ForestGEO's first forest dynamics plot, where tours were led by scientists from the

Smithsonian Tropical Research Institute (STRI). They also had a free day to explore Panama City and experience the local culture and cuisine. Mornings and evenings were spent socializing.

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**Workshop participants discuss their research with their mentors and give presentations on their projects. (photos by Lauren Krizel, Dinh Phuc Nguyen, and Daniel Zuleta)**

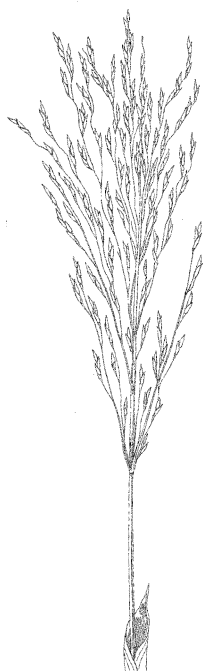
## ForestGEO

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The annual analytical workshop plays an important role in achieving ForestGEO's mission of connecting forest researchers and promoting discovery and understanding of forest ecosystems, especially in the face of a changing global ecosystem. The workshop emphasizes training the next generation of forest science researchers and expanding their toolkit for data analysis, research, and writing.

ForestGEO would like to thank the workshop participants for their dedication and hard work over the course of the two weeks. A special thanks to mentors Krista Anderson-Teixeira, Gabriel Arellano, David Bauman, **Stuart Davies**, Sean McMahon, **Jose Medina-Vega**, Helene Muller-Landau, Jessie Needham, Sabrina Russo, Joe Wright, and **Daniel Zuleta** for volunteering their time and expertise for the advancement of the forest science community.

Interested in participating in the 2024 workshop? Join ForestGEO's [Listserve](#) and follow ForestGEO on [Twitter](#) for updates about applying in the coming months.



Workshop participants exploring BCI. (photos by Daniel Zuleta, and Dinh Phuc Nguyen)



Workshop participants enjoying their free time at the hotel and in Panama City. (photos by Chen Chia Ku, Daniel Zuleta, and Dinh Phuc Nguyen)

## TRAVEL

**Stuart Davies, Jose Medina-Vega, and Daniel Zuleta** traveled to Gamboa, Panama (7/26–8/3) to participate as mentors in the 2023 ForestGEO Annual Analytical Workshop.

**Richie Hodel** traveled to Boise, Idaho (7/22–7/27) to participate, give a presentation, and lead a workshop at the Botany 2023 conference.

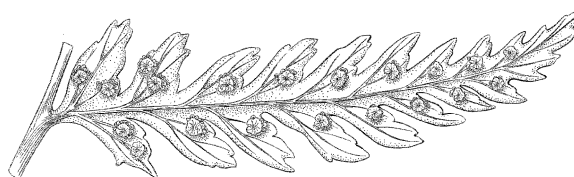
**Gary Krupnick** traveled to Boise, Idaho (7/22–7/27) to participate in the Botany 2023 conference; and to Upperville, Virginia (9/13–9/15) to attend a writing workshop focused on plant extinctions at Oak Springs Gardens Foundation.

**Robert Soreng** traveled to Turkey (7/20–8/26) to collect grasses; and to Upperville, Virginia (9/16) to teach a workshop on grass identification at Oak Spring Garden Foundation.

**Alicia Talavera** traveled to Boise, Idaho (7/22–7/27) to participate and give a presentation at the Botany 2023 conference.

**Alice Tangerini** traveled to Upperville, Virginia (7/18–7/19) to teach a drawing class at Oak Springs Gardens Foundation.

**Jun Wen** traveled to Boise, Idaho (7/22–7/27) to participate at the Botany 2023 conference and give a special lecture as the new president of American Society of Plant Taxonomists; and to the Nanling Mountains (Guangdong, Jiangxi, Hunan, and Guangxi provinces) as well as the Hubei and Yunnan provinces, China (8/3–9/8) on a plant collection trip to collect Vitaceae, Araliaceae, *Prunus*, disjunct plants between eastern Asia and North America, and food and drug plants.



## STAFF ACTIVITIES

Between July 20 and August 26, 2023, **Robert Soreng** traveled to Turkey visiting the following herbaria: ISTE, ISTF, NGBB (in Istanbul), NAKU (in Tekirdağ), ANK (in Ankara), and VANF (in Van). He worked on the genus *Poa* (Poaceae) for revision of the genus for Turkey, and Poaceae, subtribe Coleanthinae genera for Aybüke Demir's dissertation. Travelling with Dr. Evren Cabi (NAKU) and his PhD students Aybüke and Ogün Demir, Birçin Çingay (NGBB), and Marina Olonova (TK), they collected grasses mainly in eastern Anatolia, in Ağrı, Ardahan, Artvin, Bitlis, Kars, Riza, and Van provinces. Collecting was focused on the following genera: *Cata-*

*brosa*, *Catabrosella*, *Colpodium* (syn. *Zingeria*), *Hyalopoa*, *Hyalopodium* (formerly *Paracolpodium araraticum & colchicum*), *Poa* (syn. *Eremopoa*), and *Puccinellia*. About 370 numbers were collected. Sets will be deposited at NGBB and distributed to US and other herbaria.

On July 18, 2023, **Alice Tangerini** traveled to Oak Spring Garden Foundation (OSGF) in Upperville, Virginia, to teach an afternoon drawing class. She had been approached by Danielle Eady, OSGF Director of Art and Residential Programs, to lead a practical demonstration on botanical illustration in pen and ink techniques to stu-

dents in the Rare Book School in the University of Virginia (UVA). The Rare Book School and OSGF had partnered to host a short course titled Six Hundred Years of Botanical Illustration, led by Roger Gaskell (UVA) and Peter Crane (OSGF). Tangerini naturally focused on the last 50 years. In addition to the class, she presented a talk, "Illustrating at the Museum." The gardeners provided living material including *Rudbeckia*, *Dahlia*, and *Echinacea* and had made prints of the flower heads to expedite the drawing process. Tangerini received such positive feedback that she has been invited to teach for next year's class.

While in China this summer, **Jun Wen** gave an invited presentation, "Biodiversity discovery in the new age of big data, case studies in the Himalayan and Hengduan Mountain region," at the International Symposium on the Frontiers of Plant Diversity and Conservation Research in the Pan-Third Pole Region, held in Kunming, Yunnan, on August 28–31, 2023. She also gave invited seminars on "Advances in plant systematics in the new age of big data and discovery," while visiting three institutions: South China Botanical Garden in Guangzhou on August 14, Southwest Forestry University in Kunming on September 4, and Shenzhen Agricultural Genomics Institute in Shenzhen on September 6.



**Alice Tangerini teaching a drawing class at Oak Spring Garden Foundation (OSGF) in Upperville, Virginia. (photo by Danielle Eady, Oak Spring Garden Foundation)**

## VISITORS

**Zhiqiong Lan**, Chengdu University of Traditional Chinese Medicine, China; Sichuan medicinal plants (3/1 - 12/22).

**Lucas Mertehikian and 14 students**, Dumbarton Oaks; Herbarium tour (7/5).

**Mary McKenna and 10 students**, University of Virginia Blandy Field Station; Herbarium tour and plant conservation (7/7).

**Guilherme Sousa Silva**, State University of Campinas, Brazil; *Dimorphandra* and *Alexa* (Fabaceae) (7/31 - 8/7).

**Jana Haper**, Vanderbilt University; *Looking for Nanaboozhoo* project (8/16).

**Caroline Siegert**, Cornell University; Tetrapteroid clade (Malpighiaceae) (9/7 - 9/8).

**Fred Barrie**, Missouri Botanical Garden; Flora Mesoamericana (9/11 - 9/28).

**Mason Heberling**, Carnegie Museum of Natural History; *Lindera benzoin* (Lauraceae) (9/13).

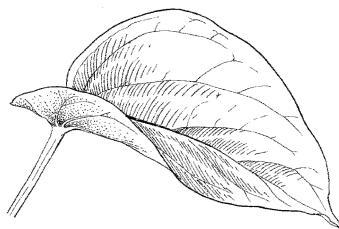
**Lei Duan**, South China Botanical Garden, Guangzhou, China; *Ormosia* (Fabaceae). (9/14/2023 - 2/14/2024).

**Magdalena Opala-Owczarek**, University of Silesia, Poland, and **Piotr Owczarek**, University of Wrocław, Poland; Arctic dwarf shrubs (9/15 - 9/20).

**Rafael Barbosa-Silva**, Goeldi Museum, Brazil; Bonnetiaceae (9/25 - 10/2).

**Nicholas Turland**, Botanischer Garten Berlin, Germany; Nomenclature meeting of the International Association for Plant Taxonomy (9/25 - 9/29).

**Dean Brookes**, Commonwealth Scientific and Industrial Research Organisation (CSIRO), Australia; Ferns (9/28 - 9/29).



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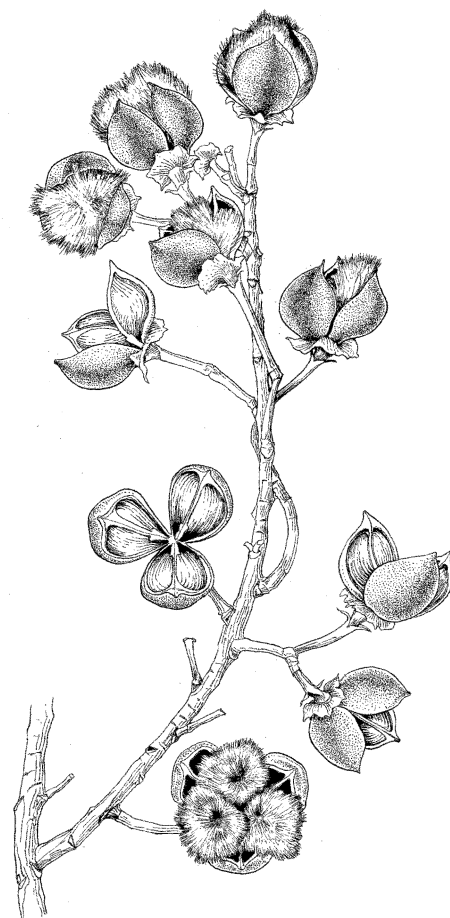
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## ART BY ALICE TANGERINI

### *Aframomum angustifolium* (Sonn.) K.Schum.

This illustration by Alice Tangerini was completed in 1995 and based on living specimens in the Botany Research Greenhouse grown from collections by John Kress.

Tangerini visited the greenhouses a number of times to make dissections and illustrate the flowers and habit. It was one of her early drawings of Zingiberales and included details of the flowers with cross sections of the ovary and anthers. *Aframomum angustifolium* is an endemic species from tropical Africa and was collected by Kress in Madagascar.

The drawing was exhibited at the 4<sup>th</sup> International Symposium on the Family Zingiberaceae held at the Singapore Botanical Gardens in July 2006 attended by Kress. Along with several other of Tangerini's illustrations of gingers, it was framed and admired by many of the attendees. In an effort to have all the drawings in Botany imaged and databased, the framed illustration was turned over to intern Erin Ellis for scanning. Ellis' expertise in scanning as well as cleaning dust and stray pencil lines resulted in a high-quality reproduction of the original.



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