

2018 PA Botany Symposium Records

Our 4th biennial Pennsylvania Botany Symposium did it again! It brought together a diverse audience from amateur to student to academic botanists, and those interested in the natural world in general. It was a unique occasion and time to share our work and celebrate our botanical heritage.

A committee of botanists from across the state worked hard to organize this event, rich with:

- hands-on workshop opportunities
- presenters who are leaders in the field
- opportunities for students to engage with professionals

Our invited speakers were carefully selected to share their expertise. Research results were presented, but at a level appropriate for an audience of diverse backgrounds. All of our invited speakers are experts with reputations for being engaging and entertaining:

- **Keynote speaker Robbin Moran**, *Nathaniel Lord Britton Curator of Botany, New York Botanical Garden*
- **Kay Havens**, *Medard and Elizabeth Welch Director, Plant Science and Conservation, Chicago Botanic Garden*
- **John Wenzel**, *Director, Carnegie Museum of Natural History, Powdermill Nature Reserve*
- **Anne Francis**, *Lead Botanist, NatureServe*
- **Peter Wilf**, *Professor of Paleobotany, Penn State University*
- **Sybil Gotsch**, *Assistant Professor of Biology, Franklin and Marshall College*
- **Roger Latham**, *Ecologist/Conservation Biologist, Continental Conservation*

The 2018 Symposium schedule included:

- **Friday, November 2** — full and half-day workshops
- **Friday evening social** with exhibitors, a student poster session, and an informal presentation
- **Saturday, November 3** — full day of presentations on a variety of botanical topics including taxonomy, conservation, ecology, biology, history and floristics

[Join our mailing list](#) to receive news of other upcoming PA Botany events in your mailbox. You'll find all of the latest details for what's ahead on this site and [our Facebook page](#).

2018 Symposium Schedule

FRIDAY, NOVEMBER 2nd

9:00 a.m. – 4:30 p.m. Workshops

Winter Woody Plant Identification

Eric Burkhart, *Faculty Member/Instructor, Penn State University*

Grady Zuiderveen, *PhD Candidate, Penn State University*

Demystifying the Challenging World of Grasses

Sarah Chamberlain, *Curator, Penn State Herbarium (PAC), Penn State University*

Botanical Consulting for Environmental Review

Joe Isaac, *Civil & Environmental Consultants, Inc.*

Breaking Up the Carex Monster
David Werier, *David Werier Botanical and Ecological Consulting*

1:30 – 4:30 p.m. Friday Workshops

I Can't Manage You if I Can't See You: Identifying Exotic Species With Similar Congeners
Art Gover, *Research Support Associate, Penn State University*

Identification of Some Pennsylvanian Ferns and Lycophytes
Robbin Moran, *Nathaniel Lord Britton Curator of Botany, New York Botanic Garden*

3:00-5:00 p.m. Vendor and Poster Setup

5:00 – 7:30 p.m. Friday Evening Social, Poster Session and Presentation

The Story of the Hidden Heuchera: How Working Together as Botanists Leads to Better Outcomes Than Working Apart
Chris Martine, *Burpee Professor of Biology, Bucknell University*

7:30 p.m. Dinner on your own

SATURDAY, NOVEMBER 3rd

8:00 – 9:00 a.m. Registration and Exhibitor Session

9:00 – 9:10 a.m. Welcome

9:10 – 10:00 a.m. Keynote Address

The Extraordinary Biology of Some Pennsylvania Ferns
Robbin Moran, *Nathaniel Lord Britton Curator of Botany, New York Botanic Garden*

10:00 – 10:40 a.m.

Subfossil Leaves Reveal Streamside Tree Communities of the Pre-European Piedmont Landscape, Southeastern Pennsylvania
Peter Wilf, *Professor of Paleobotany, Penn State University*

10:40 – 11:10 a.m. Break

11:10 – 11:50 a.m.

Climate Change on Tropical Mountains: Vulnerability to Drought and Ecological Strategies of Canopy Epiphyte Communities
Sybil Gotsch, *Assistant Professor of Biology, Franklin and Marshall College*

11:50 a.m. – 12:30 p.m.

Habitat Restoration: How to Make the Best Decisions About What Seed Provenances to Collect and Where to Use Them
Kay Havens, *Senior Director of Ecology and Conservation and Senior Scientist, Chicago Botanic Garden*

12:30 – 1:30 p.m. Lunch

1:30 – 2:10 p.m.

Digital Tools for Botanical Teaching and Research at Powdermill Nature Reserve
John Wenzel, *Director, Powdermill Nature Reserve, Carnegie Museum of Natural History*

2:10 – 2:40 p.m. Break

2:40-2:50 p.m. Student Poster Awards

2:50-3:30 p.m.

Plant Conservation Trends in North America North of Mexico

Anne Frances, *Lead Botanist, NatureServe*

3:30 – 4:00 p.m.

Cool Finds!

Roger Latham, *Consultant, Continental Conservation*

2018 Cool Finds slideshow:

<https://4321pb.files.wordpress.com/2018/11/2018-pa-botany-symposium-cool-finds-rv.pdf>

4:00 p.m.

Adjournment

2018 Symposium Workshop Abstracts

Eric Burkhart and Grady Zuiderveen

“Winter Woody Plant Identification”

This workshop will review methods used in winter woody plant identification using twig, bud, bark, fruit and form. Through a combination of indoor and outdoor group learning activities, we will develop skills and review terminology used to assess and identify trees, shrubs and vines in their winter condition. Instruction and content will be equally suited to beginners and advanced botanists alike. Participants are welcome to bring woody plant material for sharing, discussion and/or identification.

Sarah Chamberlain

“Demystifying the Challenging World of Grasses”

Looking to demystify the challenging world of grasses? Then this workshop is for you! Join Sarah Chamberlain, Botanist and Curator of the PSU Herbarium to learn skills necessary to identify this unique group of plants. The workshop will focus on basic grass morphology, the characteristics of common groups, and identification of plant specimens using Chamberlain’s recently published *Field Guide to Grasses of the Mid-Atlantic*. Slides, handouts, herbarium and freshly collected field specimens will be used to illustrate plant characters, especially those that may prove an obstacle to keying. It is recommended, but not required, that students purchase the *Field Guide to Grasses of the Mid-Atlantic*. The instructor will have extra copies on hand to use during the workshop for those who do not wish to purchase the guide, as well as copies for sale the day of the workshop. Please bring a 10x hand lens. Microscopes will be provided.

Art Gover

“I Can’t Manage You if I Can’t See You: Identifying Exotic Species With Similar Congeners”

Following in the footsteps of the excellent guide, *Mistaken Identity? Invasive Plants and Their Native Look-Alikes*, this session will explore distinguishing exotic plants with similar native congeners, with an emphasis on vegetative characters.

Joe Isaac

“Botanical Environmental Review in Pennsylvania”

This workshop covers many aspects of environmental review for plant Species of Special Concern in Pennsylvania. After a brief look at laws designed to protect our wild plants and the new Conservation Explorer, Joe will discuss important aspects of environmental review. Topics will include agency consultation, resources, survey timing, non-target species, safety equipment and procedures, managing client expectations and reporting. Short slide presentations will cover collecting voucher specimens, field survey techniques, and using available soil survey data to your advantage. Participants will review dried material of a variety of confusing species encountered during field surveys (often in less than ideal condition) to demonstrate the importance of pre-survey preparation and use of available resources.

Robbin Moran**“Identification of Some Pennsylvanian Ferns and Lycophtyes”**

This workshop will concentrate on selected genera of ferns and lycophtyes. It will use herbarium specimens to show the diagnostic characters for the species. Hand lens required.

David Werier**“Breaking up the *Carex* Monster”**

Carex is by far the most species rich genus in the Pennsylvania flora and at times can seem unwieldy. The genus is divided into more manageable and workable sections that once learned can make identification much easier. This class will help participants learn the sections. A pictorial key will be provided and numerous specimens will be available for students to work with. If time and interest allow we will also dive into some species-rich sections like *Carex* section *Acrocystis* and *Carex* section *Vesicariae*.

2018 Speaker Presentation Abstracts**Anne Frances****“Plant Conservation Trends in North America North of Mexico”**

The conservation of native plants, especially those experiencing threats and population declines, is dependent on accurate information about each species' location, population health, and protection needs. In cooperation with State Natural Heritage Programs and Canadian Conservation Data Centres, the NatureServe Network has used a standardized and vetted methodology to assess each plant species' risk of imperilment at subnational, national, and global scales for decades. These assessments, or ranks, determine priorities that support the protection and management of the most vulnerable plants. The NatureServe Network tracks the status of rare species through the mapping of Element Occurrences, which represent populations contributing to the survival and persistence of species.

This presentation will review trends in plant conservation in the US and Canada from NatureServe Network data, including conservation status assessments and Element Occurrences. We will highlight initiatives at state, regional, national, and global levels using status assessments to prioritize plant conservation. The presentation will discuss threats to plants—emerging, long-standing, and sometimes confounding—and efforts to address them. Finally, we will identify data and regulatory gaps in conservation and how these gaps may be filled by collaborations and newly available data such as online floras, digitized herbarium specimens, and citizen science data.

Sybil Gotsch**“Climate Change on Tropical Mountains: Vulnerability to Drought and Ecological Strategies of Canopy Epiphyte Communities”**

Epiphytes are ubiquitous in tropical montane cloud forests (TMCF) and are important for ecosystem function. These canopy plants intercept atmospheric water and nutrients and contribute significant inputs of these resources to the forest floor. In addition, epiphytes provide food and habitat for dozens of animal species in the TMCF. Despite the importance of the epiphyte community for TMCF function, we know little about the variation in form and function within this species-rich community or about the ability of different species to tolerate climate change. In Monteverde, Costa Rica, changes in climate over the last 40 years include increases in air temperature, cloud-base heights and drought. These changes may be particularly problematic for canopy epiphytes, which are dissociated from resources on the ground. Our research indicates that cloud immersion induces foliar water uptake and that this process is important for epiphyte water balance. In addition, we have documented significant variation in leaf form and function of epiphytes; this variation exists along a continuum relating to foliar water uptake capacity vs. leaf water storage. We have also found that epiphytic shrubs, an abundant component of the epiphyte community in the TMCF, may be particularly vulnerable to increases in drought and cloud-base heights.

Kay Havens**“Habitat Restoration: How to Make the Best Decisions About What Seed Provenances to Collect and Where to Use Them”**

The US tallgrass prairie is one of the world's most endangered ecosystems. It is also an ecosystem where ecological restoration has been practiced for nearly a century. Proper sourcing of seed for this restoration has never been straightforward, and it is becoming even more challenging and complex as the climate changes. For decades, restoration practitioners have subscribed to the "local is best" tenet, even if the definition of "local" was often widely divergent between projects. However, given rapid climate change, we can no longer assume that locally-sourced seeds are always the best option. Using examples from our work in the tallgrass prairie and the grasslands of the Colorado Plateau, we discuss what we are learning from provenance trials and how this may influence seed sourcing decisions. We review provisional seed zone maps and seed decision tools, including a new tool under development to assess options of plant provenance based on the goals and context of a given project.

Roger Latham

"Cool Finds"

Every year plant devotees make fascinating (and occasionally alarming) botanical discoveries in the hills and valleys, forests and grasslands, wetlands and barrens, lakes and rivers, mountaintops and beaches, and even urban environments across the Keystone State. It's a Pennsylvania Botany Symposium tradition to invite all to submit photos and descriptions of "Cool Finds" made within the past decade or so anywhere in the Commonwealth. This presentation will review the latest reports and describe each within the ecological, bio-geographical, historical, geological, or cultural context that makes it noteworthy.

Chris Martine

"The Story of the Hidden *Heuchera*: How Working Together as Botanists Leads to Better Outcomes than Working Apart"

The genus *Heuchera* is recognized as one of the most diverse endemic radiations of Saxifragaceae in North America, yet species delimitation and geographic distribution within the group remain controversial. Many species can be difficult to identify, including *Heuchera alba*, a narrow Appalachian endemic and globally imperiled (G2) taxon recorded only from West Virginia and Virginia that occurs in sympatry with *H. pubescens* and *H. americana*. A recent survey of the cliffside flora of the Shikellamy Bluffs, PA recorded dozens of *Heuchera* individuals that, through the use of social media, were positively identified as *H. alba*. Aided by examination of historical herbarium records, subsequent searches of similar habitats in Pennsylvania led to the discovery of seven more populations and established a significant range expansion for this rare species. The uncovering of *H. alba* in Pennsylvania is an exciting conservation outcome and an example of what can happen when botanists embrace a combination of modern and classical approaches to discovery and collaboration.

Robbin Moran

"The Extraordinary Biology of Some Pennsylvanian Ferns"

Pennsylvania harbors many species of ferns that exhibit an extraordinary biology. For instance, the bracken fern (*Pteridium aquilinum*) poisons organisms that eat it, including people, in diabolical ways. The mosquito fern (*Azolla*) floats on water and, although the world's smallest fern, has the largest economic importance of any fern because it is used as a nitrogen-rich fertilizer in many tropical regions of the world. When dry, the leaves of the resurrection fern (*Pleopeltis polypodioides*) curl into rough C- and J-shapes and appear dead. After a soaking rain, the leaves resurrect within hours, expanding their blades and resuming photosynthesis. The rapid rehydration is made possible by water-absorbing scales on the undersides of the leaves. Highly unusual are Pennsylvanian ferns that lack a spore-bearing phase, never producing a "normal" plant with roots, stems, and leaves. Instead, they exist only in the minute gamete-producing phase (gametophytes) and reproduce asexually by means of several-celled gemmae. Even more strange is that they belong to primarily tropical genera. These and other unusual Pennsylvanian ferns will be highlighted in the talk.

John Wenzel

"Digital Tools for Botanical Teaching and Research at Powdermill Nature Reserve?"

Powdermill Nature Reserve has developed several lines of digital access to botanical information as a way to connect with a broader community than those who visit the reserve in person. These include Web-based tools to provide information of interest to hobbyists and professionals alike, including emerging technologies such as Unmanned Aerial Vehicles (drones) and Virtual Reality 3D botanical models. This presentation will demonstrate several different kinds of

products: a tool that plots the 20 most common trees surveyed across the reserve; an animated timeline that shows when 150 native plants bloom and provides gardening information; a 3D model of a forest research plot that can be navigated on the Web; a collection of 3D botanical models available for Virtual Reality experiences.

Peter Wilf

"Subfossil Leaves Reveal Streamside Tree Communities of the Pre-European Piedmont Landscape, Southeastern Pennsylvania"

Widespread deforestation, soil erosion, and milldam construction by European settlers greatly influenced stream morphology and riparian vegetation in the northeastern USA. The former broad wetlands were converted into incised streams with high, unstable banks that support mostly weedy vegetation. Vast accumulations of fine-grained "legacy" sediments that blanketed the regional landscape are now being reworked from stream banks, impairing the ecological health of downstream water bodies. Because potential restoration is impaired by lack of direct knowledge of pre-settlement vegetation, we studied subfossil leaf floras recovered from precolonial hydric soils under legacy sediments at two obsolete milldam sites in southeastern Pennsylvania. At Denlingers Mill in Lancaster County, we interpret the circa early-1700s subfossil assemblage to represent an upland Red Oak-American Beech mixed hardwood forest. The White Clay Creek assemblage (circa 1650) from Chester County is composed of woody species with both riparian and hill-slope affinities. Our results add significantly to understanding of the pre-European settlement landscape, especially of the hardwood tree flora. Generally overlooked subfossil leaves can provide well-constrained paleoecological data with much potential value for restoration decisions.

Coauthors: Sara Elliott, Christen Grettenberger, Michael Donovan (Alumni, Penn State Paleobotany Lab); Robert Walter, Dorothy Merritts (Franklin & Marshall College).

2018 Symposium Speaker Bios

Dr. Eric Burkhart is a botanist who specializes in ethnobotany, non-timber forest products and agroforestry in his teaching, research and educational outreach endeavors. He holds degrees in Economic Botany (BA, Idaho State University), Horticulture (MS, Penn State University), and Forest Resources (PhD, Penn State University) and is a faculty instructor in the Penn State Ecosystem Science and Management Department where he teaches botany-related courses in Field Dendrology and Invasive Plant Identification and Management.

Faculty Member/Instructor, Ecosystem Science and Management, Penn State University

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Anne Frances is Lead Botanist at NatureServe, where she guides plant conservation activities and supports the NatureServe Network. She leads NatureServe's Global Ranking and Climate Change Vulnerability projects, and currently serves as the International Union for Conservation of Nature (IUCN) – North American Plant Red List Authority. Her diverse interests and experience in native plant conservation, ethnobotany, and restoration ecology help her to support NatureServe's efforts to protect rare plants and their ecosystems. Anne has a PhD from the University of Florida, an MS from Florida International University, and a BA from the University of North Carolina Chapel Hill. She serves as Affiliate Faculty at George Mason University.

Lead Botanist, NatureServe

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Sarah Chamberlain holds dual appointments as Assistant Research Professor at Riparia and Curator of the PAC Herbarium at Penn State University. As Curator of the PAC, she manages a collection of over 100,000 plants and seeds, conducts workshops and tours, and directs a project to digitize PAC's Pennsylvania and Mid-Atlantic collections. She has taught numerous workshops on plant identification, particularly related to grasses, sedges and rushes. She has also developed materials to aid in identification of this challenging group of plants, including a *Field Guide to Grasses of the Mid-Atlantic*, published in April, 2018 by Penn State Press.

Curator, Penn State (PAC) Herbarium

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Dr. Sybil Gotsch's research is focused on understanding the form and function of epiphyte communities in the Tropical Montane Cloud Forest. She has been a faculty member in the Department of Biology at Franklin and Marshall College since 2012. Prior to 2012, Dr. Gotsch worked as a post-doc in the cloud forests of Veracruz, Mexico (University of New Hampshire) and the Cerrado of Central Brazil (North Carolina State University). Dr. Gotsch received her PhD in Ecology and Evolutionary Biology from Stony Brook University in 2006. Her doctoral research addressed the effects of seasonality on leaf traits of common tree species in wet and dry seasonal tropical forests.

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Art Gover has been involved in weed control/plant community manipulation for 30 years, focusing on natural areas with DCNR-State Parks for the last ten years. Managing invasive species before they exert significant influence is a fundamental tenet of his management approach. This presentation will endeavor to identify the subtle differences between a number of exotic species and very similar native species, relying largely on vegetative characters.

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Kay Havens holds a BS and an MA in Botany from Southern Illinois University and a PhD in Biology from Indiana University. She joined the Chicago Botanic Garden in 1997. She is currently the Garden's Senior Director of Ecology and Conservation and Senior Scientist. Her research interests include the effects of climate change on plant species, restoration genetics, pollination networks, ex situ conservation, and invasion biology. She chairs the Non-federal Cooperators Committee of the Plant Conservation Alliance and collaborates with a variety of academic institutions, agencies and stewardship organizations to help improve conservation efforts for plants.

Senior Director of Ecology and Conservation and Senior Scientist, Chicago Botanic Garden

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Joe Isaac is a botanical consultant and Project Manager with Civil & Environmental Consultants, Inc. (CEC) in Pittsburgh. He has been employed by CEC since 2003. Joe received his Bachelors and Masters degrees in Biological Sciences with emphasis in Plant Sciences from Youngstown State University in Youngstown, Ohio. He serves on the Pennsylvania Botany Symposium Committee and the Pennsylvania Vascular Plant Technical Committee of the Pennsylvania Biological Survey.

Project Manager, Civil & Environmental Consultants, Inc.

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Roger Latham has worked as a research ecologist, conservation biologist, and environmental planner since the year the Endangered Species Act was passed (1973). After earning a PhD in Biology at the University of Pennsylvania, he served as Pennsylvania Director of Science and Stewardship for The Nature Conservancy, post-doctoral researcher in biogeochemistry and fire ecology in Penn's Department of Geology, and faculty member in the Department of Biology at Swarthmore College. For the last 18 years he has been a full-time consultant, conducting applied research and planning for agencies and organizations involved in wildlands stewardship and endangered species recovery.

Consultant, Continental Conservation

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Chris Martine, the David Burpee Professor at Bucknell University, spent his childhood tromping through the woodlots and culverted streams of suburban New Jersey. By the time he was a teenager he had memorized a handful of Golden Guides, but it wasn't until a few years later, as a first-gen college student, that he realized a person could "do nature" as

a career. A significant focus of his life since then has centered on a desire to a) discover cool stuff and b) tell people about it. Chris actively engages non-science audiences across multiple outlets, including as host/producer of the YouTube series “Plants are Cool, Too!”

David Burpee Professor, Department of Biology, Bucknell University
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Dr. Robbin Moran is the Nathaniel Lord Britton Curator of Botany at The New York Botanical Garden. His research interests are ferns, horsetails, and lycophytes. He has published over 120 scientific papers and four books on ferns. His general interest book, *A Natural History of Ferns*, won the Garden Writers Association Award for best writing. Each year Robbin teaches a fern course at the Eagle Hill Biological Station in coastal Maine, and a graduate-level course, Tropical Plant Systematics, for the Organization of Tropical Studies in Costa Rica.

Nathaniel Lord Britton Curator of Botany, The New York Botanical Garden
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John Wenzel was a professor at Ohio State University for 17 years, and joined the Carnegie Museum of Natural History in 2011. As Director of Powdermill Nature Reserve, the research field station of the museum, he has built new education and research programs including greatly expanded emphasis on plant biology.

Director, Powdermill Nature Reserve, Carnegie Museum of Natural History
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David Werier is a student of the flora of eastern North America (primarily New York State) and author of the recent Catalogue of the Vascular Plants of New York State. He is particularly fascinated with the hyperdiverse genus *Carex* and enjoys sharing his plant knowledge with those that are interested. He regularly offers plant identification workshops on different “challenging” taxonomic groups and is known as an inspiring, patient, knowledgeable, and clear teacher. He strives to have his students walk away inspired and ready to work independently.

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Peter Wilf is a paleobotanist who uses fossil plants to investigate ancient ecosystems, past environmental change, and the evolution and extinction of plants and plant-insect associations. He emphasizes research questions with relevance for modern climate change, biodiversity, biogeography, and ecological processes. Principal field areas include Patagonia, Argentina, and the Western Interior USA. Recently Peter’s lab group, in collaboration with colleagues at Franklin & Marshall College, has been using the techniques of deep-time paleobotany to better understand the precolonial vegetation of southeastern Pennsylvania from subfossil leaf mats preserved under abandoned-milldam deposits.

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Grady Zuiderveen is a PhD candidate in the Department of Ecosystem Science and Management at Penn State researching medicinal herbs native to the eastern United States. He holds a bachelor’s degree in Plant Biology and Biomedical Science from Grand Valley State University and an MS from Michigan State University and has helped teach courses in Field Dendrology and Forest Measurements and Management.

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