Discover, Connect, Engage

New Exhibits, Resources Mark Visitor Center Improvements

Outdoors, plants are just breaking out of dormancy—but indoors in the Visitor Center it’s been an active winter. Come experience some new ways to explore the Arnold Arboretum and the world of plants.

On your next visit, be sure to explore our new exhibit, *John George Jack: Dendrologist, Educator, Explorer*, the first of a regularly changing display of objects, books, and photographs highlighting the Arboretum’s past and present. Curated by librarian Lisa Pearson, our first temporary exhibit in the Visitor Center uses photos and letters to illuminate the life and work of J. G. Jack (1886-1935), who worked at the Arboretum as a plant expert and educator for more than forty years.

In the new reading area, take a moment to browse a rotating selection of publications from the Arnold Arboretum Horticultural Library. You’ll find Arboretum classics like *Science in the Pleasure Ground* as well as the latest issues of *Arnoldia* and *Silva*, plus recent additions to the library collection. The reading area in the Visitor Center will promote our library and share more of its rich and diverse holdings.

This spring, new technology in the Visitor Center will connect you to the Arboretum’s expanding digital resources, including a web-based interactive map and seasonal highlights. New digital signage will reveal more about our dynamic and ever-changing collections, research, and programs. Plus, a new greeting area and new carpet give the space a fresh look.

Extended hours launch on April 1 and continue until October 31. During this time the Hunnewell Building will be open weekdays from 9:00am to 6:00pm, with the Visitor Center open from 11:00am until 6:00pm. On weekends, the building and Visitor Center will be open from 11:00am until 6:00pm. We hope these extended hours will attract new visitors to the Hunnewell Building and allow for more opportunities to connect and learn. In addition to our knowledgable staff, look for new student workers in the Visitor Center or roaming the nearby landscape with a tablet computer, ready to help you explore the Arboretum.

The Visitor Center is a work in progress. Over the next few years look for more changes to the space—and the activities we provide for visitors—as we work to improve how we help you access the remarkable plants, fascinating stories, and outstanding resources of the Arnold Arboretum.

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Join us for a Visitor Center Celebration

Saturday, April 27, 11:00am–2:00pm

Drop by the Visitor Center for a celebration of enhancements to the space. Free.
From the Director

One of the things that truly delights me about the Arnold Arboretum and its vibrant community of members, visitors, and researchers is learning the many different ways that people experience and enjoy this landscape and collection. Folks of all ages love the Arboretum for their own special reasons, many quite personal. Some spent their childhoods sledding down Peters Hill in the winters and climbing to the top of Hemlock Hill in the summer. Others courted spouses here, got married here, and brought their children here in strollers and on bicycles to enjoy being outside together among majestic trees. For generations, the Arboretum has offered a beautiful and inviting green space to explore and create connections with the natural world in the heart of Boston.

No matter how you first encounter this landscape, there are many paths to take to gain a deeper appreciation of what the Arboretum is and means in today’s world. First and foremost, you can become acquainted with more than 15,000 living plants collected from around the world, and observe how each one changes with the seasons and responds to its environment. This spring, a number of events invite you to dig deeper into the rich and diverse plant collections at the Arboretum to make discoveries of your own. In this issue of Silva, you’ll read about maples, ginkgos, and rhododendrons—some of the plants we hope you’ll get to know a little better through special free events we’re offering visitors this spring. And of course our Tree Mobs™ continue all year round, giving you multiple opportunities each month to join us in the landscape and learn more about the Arboretum, one tree at a time.

As a center for acquiring new knowledge about plants and their essential value to humankind, the Arnold Arboretum offers unique programs for learning and personal enrichment throughout the year. We begin with opportunities for pre-school children to make their first scientific discoveries about plants and animals, both in the classroom and in our landscape. This issue of Silva profiles our work with neighboring Head Start classrooms to introduce natural themes in their curricula, and ready children for experiences they’ll subsequently undertake in our elementary Field Studies programs. Lifetime learning continues with internship and fellowship programs for undergraduate, graduate, and post-doctoral students to advance their budding careers through the study of our curated plants, and extends to diverse and compelling classes and workshops for adults.

All that we do to bring people closer to our plants and the greater realms of science, horticulture, and conservation could not be possible without the support of our members and generous friends. We thank you for partnering in our work and for your continued interest and commitment to the Arnold Arboretum.

—William (Ned) Friedman, Director of the Arnold Arboretum & Arnold Professor of Organismic and Evolutionary Biology, Harvard University
Another Season of Interest for Maples
Fall’s Leaf-peeping Favorites Offer Spring Beauty Too

Nancy Rose, Editor of Arnoldia

Think “spring-flowering trees” and magnolias, cherries, or crabapples are more likely to come to mind than maples (Acer spp.). Yet the flowers of many maples prove to be quite beautiful on close examination. With nearly 150 Acer taxa in the collection, the Arboretum is an ideal place to observe maple flowers in bloom from late winter to late spring.

As a group, maples display an amazingly wide range of leaf shapes, bark characteristics, and growth habits. This diversity carries through to maple flowers as well. There are a surprising number of variations in inflorescence types, including corymbs, panicles, and racemes. Some racemes are strongly upright, as in mountain maple (Acer spicatum), but many are pendulous, forming graceful, dangling flower chains that reach lengths up to six inches in species like striped maple, or moosewood (A. pensylvanicum). Individual maple flowers also vary in form between species, from open saucers to bell, urn, or crownlike shapes. Petals and sepals may look the same, or be very different in form and color. Boxelder, or Manitoba maple (A. negundo), lacks petals entirely. Maple flowers exhibit quite a range of colors, from pale green to chartreuse, yellow, orange, and shades of red from scarlet to burgundy. In early-flowering species like red maple (A. rubrum) that bloom before the leaves emerge, the colorful flowers are especially noticeable. Species like Japanese (A. palmatum) and Korean maple (A. pseudosieboldianum) bloom as the leaves are emerging; this makes the flowers a little harder to see, but the combination of dangling blossoms and delicate new foliage offers a real spring delight.

Maple flowers also display a complex range of sexual expression. A few species are dioecious (male and female flowers are borne on separate plants), including vine-leaf (or ivy-leaf) maple (Acer cissifolium), Henry’s maple (A. henryi), and boxelder. Most maple species are monoecious (they bear both male and female flowers on the same plant), but within this strategy there are many variations on traits like ratios of male and female flowers and functionality of flower parts. Adding to the confusion is the fact that these traits can change over time in some maple trees. For example, a tree might produce mostly male flowers for many years, then switch to mostly female flowers. Botanists continue to study the evolutionary basis of these strategies.

The value of the Arboretum’s maple collection goes well beyond its seasonal beauty. It holds extensive wild-collected accessions, making it a globally important collection for maple germplasm conservation, especially for a number of rare and endangered species. The Arboretum is designated as one of the North American Plant Collections Consortium’s maple collection sites, and we continue to provide propagation material and study opportunities for maple researchers around the world.

Collections Up Close: Magnificent Maples

For a special opportunity to explore the maple collection, join us for Collections Up Close: Magnificent Maples on Sunday, April 21 from 1:00 to 3:00pm. Take a guided tour to look for maple blossoms and bright new leaves, participate in a fun science activity for kids, and chat with knowledgeable staff and volunteers about this world-class collection. Free.
A sample of some of the diversity in flower form and color in the Arboretum’s important maple collection includes (clockwise from top left) the yellow-green upright racemes of *Acer spicatum* (mountain maple); the pale green racemes of *A. rufinerve* (redvein maple); the red apetalous inflorescences of *Acer saccharinum* (silver maple); the yellow racemes of *A. macrophyllum* (bigleaf maple); the red pistillate flowers of *A. rubrum* (red maple); and the yellow corymbs of *A. platanoides* ‘Faassen’s Black’ (cultivar of Norway maple).
A PARTNERSHIP FLOWERS

Arboretum Expands Program for Pre-School Nature Learning

Nancy Sableski, Manager of Children’s Education

How early can children begin learning about science? At the Arnold Arboretum, investigations on natural themes begin for children in pre-school, and seasonal outdoor programs have been offered for a number of years to children from South Side Head Start in neighboring Roslindale. This fall, Arboretum school science specialist Ana Maria Caballero began biweekly visits to South Side classrooms with plant materials and activities that engage the children with science. Funded by the Nature Study Fund for Urban Children, the collaboration represents a step forward in the Arboretum’s ongoing efforts to inspire the natural curiosity of Boston’s urban schoolchildren.

On one recent visit to South Side, Ana Maria shares a cut branch of white pine with a group of preschoolers. The children explore the plant and its parts and describe their observations, two of the most basic scientific skills. For young children whose communications skills are rapidly expanding, employing multiple senses in the activity helps them to discover and embrace new words to describe shape, texture, smell, sensation, and sound. One child picks up a magnifying glass, and soon everyone is captivated by the introduction of a tool used by scientists. Once all have enjoyed a closer look, Ana Maria guides the group in making observational drawings of the branches. Drawing from life develops the children’s fine motor skills, and the exercise provides another compelling avenue for them to apply and share what they’ve learned.

Before their science time ends for the day, Ana Maria introduces a new plant from the Arboretum for study—a cedar. Together they explore how the cedar curves and branches, noting how its texture and even its scent differs from the white pine. Ana Maria models the curves and branching patterns in a simple drawing, and the children take up their crayons to focus on this new challenge. After labeling each drawing, Ana Maria glues small branches of pine and cedar to the children’s work. The children will keep and take home their examples of comparing and contrasting objects, introducing them to the next key developmental skills of science.
While the Arboretum’s collaboration with Head Start focuses on building young investigative skills, the program also helps instructors at the center to increase their comfort level in object-based teaching. They report marked growth in the children’s enthusiasm for science and their abilities to use new words and make careful observations. The Arboretum has also shared an array of books with the center, further broadening the conversation about nature. Ana Maria has tailored many of the investigations to fit the monthly themes studied in the classroom, adding a new dimension to the understanding of seasons, self, and family.

This spring the children from South Side Head Start will visit the Arboretum landscape with fresh skills in observing, communicating, and representing the natural world. Not only will the field experience provide a rich setting for exploration, but the children will also put their new skills to use in examining, discussing, and recording the plants and animals they encounter. With repeated experiences in the classroom and in the field, the Arboretum assists these young scientists in developing their innate capacity to explore and be inspired by the world around them.

Seeing Science Through the Eyes of Children

It’s never too early to plant the seeds of scientific inquiry. As part of its programs for children’s education, the Arboretum has partnered over the past two years with the Boston Teachers Union (BTU) School. As Director William (Ned) Friedman notes, “For more than three decades, the Arboretum has engaged with Boston Schools to support science and nature learning. Our partnership with the BTU School presents a unique opportunity for these efforts to grow in new directions.”

Children are naturally inquisitive, with an urge to experiment and explore. Yet studies have shown that as early as kindergarten, many children demonstrate negative views of the sciences and growing doubts about their own ability to understand and engage in scientific inquiry. As a result of the Arboretum–BTU partnership, students from kindergarten through fifth grade now receive regular, hands-on life science education, coordinated and taught by Arboretum children’s education staff. Younger students build observation skills, develop science vocabulary, and communicate what they see and predict in science notebooks; older students design experiments and conduct research. By introducing science education in the earliest grades we can nurture a love of science, bolster students’ excitement for scientific investigation, and teach important concepts about natural history.

Opening in mid June, the art exhibition, “Through a Child’s Eye,” celebrates the beautiful ways in which BTU students are learning to examine, describe, and formulate questions about the natural world. According to Director Ned Friedman, “Seeing how kids observe nature and carefully illustrate their findings encourages us all to reflect on the meaning of discovery.”

Works in the exhibition include this drawing by a BTU School student of an "eco-column" with a terrarium (top) and aquarium, part of the Arboretum’s focus on ecosystems with fifth graders.
About 50 years ago, Arboretum botanist Irving Widmer Bailey (1884-1967) led an expedition to collect tropical plants in Queensland, Australia. Among the plants obtained was a previously undescribed woody vine that climbed up to 40 feet and produced showy flowers at its top. Named *Austrobaileya scandens* to honor Bailey, the species was first published in *The Journal of the Arnold Arboretum*.

Today, botanists consider *Austrobaileya* to be a remnant of one of the most ancient lineages of flowering plants, offering crucial information for our understanding of how these plants evolved. Last November, staff from the Arboretum returned to Queensland to collect seeds of *A. scandens* as part of Director William (Ned) Friedman’s groundbreaking research into the reproductive adaptations of early flowering plants.

For this expedition, Arboretum experts in horticulture and botany joined forces. One of us is a veteran arborist who contributed many years of experience with tree-climbing equipment, skills in scaling large trees in dense and sometimes thorny environments, and an understanding of proper safety measures in the field. The other is a postdoctoral research scientist who coordinated collection protocols and managed preservation procedures for the collected plants.

During our two-week trip, we collaborated fully in collecting *Austrobaileya* in Queensland’s vast tropical forests and in conducting initial lab work at CSIRO (Commonwealth Scientific and Industrial Research Organisation) in the small town of Atherton, Australia.

With the help of Wendy Cooper, a freelance Australian naturalist, we located 42 vines with flowers or fruits. From these, we collected and prepared more than 140 fixed samples of *Austrobaileya* for lab analysis, and gathered nearly 500 mature seeds, many of which will be used for propagation. Collections included leaves for DNA extraction and flowers and fruits at various developmental stages. The opportunity to collect plants in the field is an experience highly valued by biologists, and one perhaps rarely experienced by an arborist. For both of us, the expedition provided a means to observe how plants grow and reproduce in a rainforest environment, providing more information that can assist us in the investigation of their biology.

The diversity of Australia’s flora and fauna is incredible and its habitat is rather astonishing. Given that the Arboretum’s living collections are almost entirely derived from the Northern Hemisphere, we were excited to encounter the biodiversity that occurs south of the equator. Despite working under somewhat arduous conditions and bearing the rigors of the field, the trip was a success in every respect. From a personal point of view, we each gained a great deal from each other’s help and expertise over the course of our journey, and became good friends as well as colleagues.

“This expedition,” said Director Ned Friedman, “offers a wonderful reminder of the continued relevance of exploring plants around the world as a part of our mission and legacy. Whether we’re collecting plants in their native environments or stewarding their growth in our landscape, the Arnold Arboretum’s work to connect people and plants continues to play a critical role in expanding our understanding of botanical diversity and its importance to us all.”
W hen you visit the Arnold Arboretum, most of the conifers you encounter are evergreen, holding their leaves through all seasons. Extant conifers throughout the world are overwhelmingly evergreen and dominate high-latitude boreal and alpine forests, where longer leaf lifespans are favored. Although a small number of deciduous conifers exist and are represented in the Arboretum collection—including species of *Larix* (larch), *Metasequoia* (dawn redwood), *Pseudolarix* (golden larch) and *Taxodium* (bald cypresses)—these plants usually are confined in the wild to wet environments. Researchers surmise that the relatively low capacity for water transport in conifer xylem has limited their ability to exploit a deciduous habit in all but moisture-rich environments. Therefore, the ability of some conifers to shed their leaves annually may carry with it the penalty of increased sensitivity to dry conditions, limiting their diversity across the world.

Untangling the biology underlying this paradox ideally begins with studies that compare deciduous conifers and their close evergreen relatives growing in a common garden. The rich and well-documented collection of conifers at the Arnold Arboretum and its advanced laboratories offer the right tools for this work, and the Putnam Fellowship Program gave me the opportunity to conduct studies here to advance our understanding of these plants. Trained in plant physiology and ecology, I am interested in revealing how the functions of plants are shaped by environmental conditions. Specifically, my research has focused on long-distance water transport in vascular plants and the role it plays in determining how they respond to challenges like drought and the stresses incurred by low temperatures.

Over the course of my Putnam Fellowship, I am studying the Arboretum’s deciduous and evergreen conifer species to identify any major differences in their hydraulic capacity or their response to drought or cold stresses. Primary results suggest that when compared with their close evergreen relatives, deciduous conifers demonstrate significantly higher efficiency in water transport, but suffer the cost of higher susceptibility to hydraulic failure in dry conditions. As my research continues in coming months, I will be measuring the susceptibility of conifer xylem to freezing stresses and testing the biomechanical traits that enable their stems to handle the challenges that commonly occur in their habitats, such as heavy snow loads and strong winds. My study has benefited by interacting closely with other Arboretum scientists, including collaborating with Sargent Fellow Sarah Mathews to analyze the evolution of plant functional traits. My research as a Putnam Research Fellow is supervised by Harvard Professor N. Michele Holbrook, whose own work in this field has been inspiring.

Investigating xylem functions in conifers will improve our understanding of how these plants have adapted to some of Earth’s most forbidding environments, and perhaps shed light on their competition with flowering seed plants—the angiosperms. Another factor in the paradox of conifer habit is that deciduous species may be more susceptible to human disturbances and the effects of climate change. In addition to its own scientific merit, this study may contribute to the conservation of deciduous conifers as a beautiful and eminently fascinating element of biodiversity.

*Guang-You Hao, Putnam Research Fellow*

*Putnam Fellow Guang-You Hao uses a portable photosynthesis system on a branch of *Pseudotsuga menziesii* (Douglas fir) in the Conifer Collection to collect data on leaf gas exchange.*
When I started my research last summer at the Arnold Arboretum, I expected to be conducting my studies at a manicured, immutable “museum” of trees. Instead, I was immediately faced with a dynamically changing landscape. Magnolia flowers bloom, close up, and then bloom once again the following day. Leaves unfurl and foliage changes. Day to day, season to season, a new Arnold Arboretum greets its visitors.

In the coming decades, climate change is expected to significantly alter these seasonal occurrences, as well as plant distributions around the globe. Unable to adapt to changing environmental conditions, many species may face imminent extinction. My research at the Arboretum focuses on characterizing how species’ ranges may shift, by identifying which plants will thrive outside of their ranges, and which are in the greatest danger of disappearing. This work represents part of a broader effort to understand plant adaptation, movements, and climate change led by Professor Dov Sax at Brown University and Professor Jesse Bellemare at Smith College, in collaboration with Arboretum Curator of Living Collections, Michael Dosmann.

Some of the azaleas New Englanders love planting in their gardens, such as *Rhododendron calendulaceum* (flame azalea), are technically supposed to survive only in the Appalachians where the species is “native.” Yet anyone who has seen these plants thriving in Massachusetts would think it was a native of our region. At botanical gardens many “exotic” plant species like this azalea do just as well, if not better, than some of their native counterparts. This is because the line between exotic and native is often blurred.

Exotic plants that are able to persist outside of their native ranges and establish populations are characterized as “naturalized” species. One of the most definitive measures we have to determine whether or not a plant has naturalized to its environment is the evidence of seedlings. This indicates not only a plant’s potential for reproduction (e.g. seeds, flowers and fruits) but its actual success. To measure seedlings, I first created a list of woody plants native to North America, but exotic to this part of New England. I then cross-referenced these 265 species with the Arboretum’s historical records to locate past instances of seedling occurrences or distributions to members or other gardens. Finally, I walked the extent of the Arboretum, visiting each of these exotics on the grounds, looking for seedlings. Finding seedlings shows the plant in question can reproduce in this exotic climate, and improves the distribution map of said species.

The Arnold Arboretum is an ideal location to conduct this type of research because botanical gardens often attempt to cultivate species that are not native to the region. As a Visiting Research Fellow at the Arboretum, I have access to the diverse and expansive woody plant collection, over a century of historical records and herbarium specimens, and the support of the curatorial department. Michael Dosmann’s guidance proved invaluable when I expanded...
my research to other botanical gardens. After exploring the Arboretum, I performed similar searches at Bartram’s Garden and the Tyler Arboretum in Pennsylvania and then the Cary Institute in New York to see how these same plants were doing in different climates of the East Coast. Combining these data will provide a sharper image of the conditions such plants can survive in.

When these exotics survive and reproduce outside of their native range, it is important to determine which of their adaptations or traits (such as dispersal and pollination mechanism, range size) are allowing each plant to reproduce and spread without assistance. Coupling reproduction information gathered from across the East Coast with climatic data will enable us to predict where plants with certain characteristics will be able to survive in the future. Crucially, the Arboretum maintains its own catalogue of naturalizing species that dates back to 1874 when Charles Sprague Sargent conducted an initial survey. The herbarium specimens I collected at the Arboretum will be added to this spontaneous flora collection to contribute to our understanding of how plant ranges will be affected by climate change. One aim of this continuing investigation is to help determine appropriate species for “managed relocation,” a strategy which has been proposed to move endangered plants to areas more conducive to their survival in an attempt to conserve biodiversity.

Remembering Shiu-Ying Hu, Botanist and Teacher

Professor Shiu-Ying Hu, Emeritus Senior Research Fellow of the Arnold Arboretum of Harvard University, passed away last May in Hong Kong at age 102. An eminent scholar and plant taxonomist, Professor Hu served as Honorary Professor of Chinese Medicine at the Chinese University of Hong Kong and Senior College Tutor of Chung Chi College. During her long and productive career in plant science, she collected and identified as many as 185,000 plant specimens, published more than 160 papers, and was an internationally-recognized authority on *Ilex* (hollies), *Hemerocallis* (daylilies), *Paulownia*, *Compositae* (daisies), and *Orchidaceae* (orchids).

The first Chinese woman to obtain a doctoral degree in botany at Harvard, Professor Hu began working at the Arboretum as an herbarium assistant in 1949. Named a research assistant by Director Richard Howard in 1953, Professor Hu devoted herself full time over the next several years to the *Flora of China* Project. Professor Hu’s nearly seven decades of work as a researcher and teacher inspired multiple generations of botanical students around the world. As the steward of one of the premiere collections of Chinese plants cultivated outside of Asia, the Arnold Arboretum served as a focal training ground for Shiu-Ying Hu, and, following her retirement from the Arboretum in 1967, she continued to make discoveries about Chinese plants in both Hong Kong and at the Harvard University Herbaria.

The recipient of numerous awards and honors during her lifetime, Professor Shiu-Ying Hu will be remembered as a scientist and teacher by the Arnold Arboretum in perpetuity through a new award for emerging scientists who wish to follow her example of diligence and scholarship. Income from the Shiu-Ying Hu Student/Postdoctoral Exchange Award Endowment will support American-Chinese exchanges for students to work on the comparative biology of plants at the Arnold Arboretum and similar institutions in China. The fund recognizes the lifelong contributions of Shiu-Ying Hu to plant science and education, and supports the Arboretum’s mission-directed priority to enhance our knowledge of the related floras of China and North America.
Glowing Ginkgos

Peter Del Tredici, Senior Research Scientist

Senior Research Scientist Peter Del Tredici has been studying and writing about Ginkgo biloba for more than thirty years. Here, he provides a candid account of attending a festival in celebration of the plant in Tokyo, Japan on December 2, 2012. The Arboretum celebrates its own collection of ginkgos with Ginkgo Fest on April 20. See the listings on page 12 for details.

Around three in the afternoon, I took the Ginza subway line to the Gaiemmae stop, where a ginkgo festival was supposed to be happening. Emerging from the station, I walked in the direction that most people seemed to be headed. After fifty meters or so, I spotted the tall yellow spires of some ginkgo trees in the distance and before long I found myself on Icho Namiki, a five-hundred-meter long street lined on either side with a double row of large ginkgo trees planted in 1923. Wide sidewalks passed between each of the double rows and they were crowded with people admiring the glowing yellow leaves on the perfectly pruned, conical trees. While I had seen pictures of this famous street, experiencing the quadruple row of trees in person took my breath away—the ginkgos were in perfect color, glowing in the afternoon light. I couldn’t stop taking pictures of them nor could most of the people who were there with me.

I can’t really do justice in writing to the scene that surrounded me: crowds of people promenading along a carpet of fallen yellow leaves under a canopy of golden foliage, all surrounded by a clear blue sky. While adults were trying to capture the scene with a cell phone or camera, children were collecting and throwing handfuls of leaves like snowballs. Young and old alike were blissfully bathing in the radiance of the trees, absorbing their beauty and energy.

At the far end of the allée, near the Meiji Memorial Picture Gallery, there were numerous vendors selling an incredible array of Japanese fast foods. To my disappointment, however, there was only one vendor selling anything related to ginkgo, a carpenter with cutting boards made from ginkgo wood (which has no resin and is easy to clean). While the carpenter spoke only Japanese, his daughter spoke enough English to allow us to have a conversation about how much we both loved ginkgo trees (and, of course, I bought a couple of cutting boards). The only frustration of the afternoon happened when I tried to buy an official ginkgo shirt off the back of one of the volunteers who was directing traffic. He would have none of it, even after I pulled out my wallet and offered him as much money as he wanted. Finally around five o’clock, with the sun setting and my spirit soaring, I made my way back to the subway station.

Around nine the next morning, I returned to Icho Namiki to photograph the trees in a different light and found a much calmer scene. There were many fewer people around and the road was closed to traffic for a series of children’s road races which were just getting started. A unique photographic opportunity presented itself as hoards of kids raced along the street through the canopy of golden ginkgos with parents cheering them on. I couldn’t get over the fact that I had found this magical place by virtue of a remarkable set of coincidences: first, that I was in Japan in early December; second, that I only learned about the festival from a casual conversation the day before; and third, that I managed to navigate the Tokyo subway system on my own. Clearly it was meant to be.
The Arboretum offers a variety of learning opportunities for adults. Below is a partial list of our spring/summer classes and lectures followed by descriptions of featured programs. To view all programs by month, please visit our online registration system at my.arboretum.harvard.edu. For additional assistance, call Pamela Thompson at 617.384.5277.

### Schedule of Classes and Lectures

**March**
- 15 Wildlife in the Landscape
- 16 Creating a Compact Orchard
- 18 Garden as Community: Planting by Guild
- 20 Flower Form and Function
- 21 Growing Nuts in the Northeast
- 27 Rosemary Verey: Legendary Gardener

**April**
- 6 Growing Plants from Seeds
- 8 The New You: Symbiosis and the Individual
- 8 Climate Change Comes to Thoreau’s Concord: Impacts on Wildflowers, Birds, and Butterflies
- 16 Forecasting the Future
- 20 Ginkgo Fest: Celebrating *Ginkgo biloba*
- 24 Plants of New England: A History in Deep Time
- 28 Spring Wildflowers of the Northeast
- 29 Good Fungus, Bad Fungus
- 30 Mycorrhizal Symbioses and the Functioning of Terrestrial Ecosystems

**May**
- 1 Global Environmental Threats: Why They are So Hard to See and How Using a Medical Model Can Help

**May (continued)**
- 5 Shrubs Across the Seasons: May
- 7 Attracting and Supporting Birds
- 13 Written in the Genes: Forest Tree Evolution, Growth, and Reaction to Climate Change
- 16 How Do Woodpeckers Avoid Brain Injury?
- 18 Nature Photography Workshop
- 30 The Physical Fitness of Leaves

**June**
- 5 Flash Night: Learning to Socialize with Fireflies
- 18 Ericaceae Family Focus
- 21 In the Groves: A Summer Solstice Journey
- 22 In the Groves: A Summer Solstice Journey

**July**
- 10 Shrubs Across the Seasons: July
- 13 Introduction to Plant Families
- 18 Inventing Wine: A New History

**September**
- 24 Introduction to Botany
- 28 Focus on Bonsai: History and Horticulture
- 29 Shrubs Across the Seasons: September

See more at my.arboretum.harvard.edu

### Key to Abbreviations

| HB   | Arnold Arboretum, Hunnewell Building, 125 Arborway, Boston |
| WH   | Weld Hill Research Building, 1300 Centre Street, Roslindale |

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**Link Up With a Tree Mob™**

Tree Mobs are interactions with scientists or other specialists at the Arnold Arboretum, and provide another pathway to enjoy and learn in the landscape. Experts share little-known facts about our living plant collection, its relevance today, and its importance to future generations. Sign up on our website to receive notices, and join us to discover something new. Free.
Flower Form and Function
Julien Bachelier, PhD, Arnold Arboretum
Wed Mar 20 and Apr 10 5:30–7:30pm [HB]
In both the classroom and our landscape, you will look closely at flowers to see how evolution of plant reproduction has shaped their forms and functions. The first session will include an introductory overview on what makes a flower a ‘flower’ and the diversity of flowering plants, followed by a focus on the easily overlooked wind pollinated flowers. The second session will introduce the tremendous diversity of insect pollinated flowers and pollination mechanisms, and the evolution of highly specialized reproductive strategies that are sometimes just ‘too good’ to be true.
Fee $40 member, $55 nonmember

Rosemary Verey: The Life and Lessons of a Legendary Gardener
Barbara Paul Robinson, Lawyer, Gardener, and Biographer
Wed Mar 27 6:30–8:00pm [HB]
Rosemary Verey was the acknowledged apostle of the “English style,” a trusted garden adviser to the rich and famous, and a beloved and wildly popular lecturer in America. A prolific writer, she was a natural teacher, encouraging her fans to believe that they were capable of creating beautiful gardens while validating their quest for a native vernacular. Barbara Paul Robinson, who worked for Rosemary Verey and has written her first and so far only biography, will speak about Verey’s life and her contributions to the field of landscape design.
Fee $5 member, $15 nonmember

Forecasting the Future: Can Ecologists Predict the Fate of Plant and Animal Populations?
Elizabeth Crone, PhD, Population Biologist, Harvard Forest
Tue Apr 16 6:30–7:30pm [HB]
Elizabeth Crone will describe how plant ecologists monitor populations and use these patterns to predict how species will respond to changes in habitat management, climate, and more. She will speak about successes and failures in forecasting the futures of different plant populations, and describe how ecologists go about the science of fortune-telling.
Fee Free member, $10 nonmember

Ginkgo Fest: A Celebration of Ginkgo biloba
Peter Crane, Yale University; William "Ned" Friedman and Peter Del Tredici, Arnold Arboretum of Harvard University
Sat Apr 20 10:00am–4:00pm [WH]
Join three renowned ginkgo experts for a celebration of all things ginkgo. The day will include lectures, a tour of the Arboretum’s Ginkgo biloba collection, lunch with a variety of ginkgo nut dishes, and a display of ginkgo artifacts and illustrations.
Fee $75 member, $100 nonmember (includes lunch)

The Plants of New England: A History in Deep Time
Andrew Knoll, PhD, Fisher Professor of Natural History and Professor of Earth and Planetary Sciences, Harvard University; Curator of Paleobotanical Collections, Harvard University Herbaria
Wed Apr 24 7:00–8:30pm [HB]
Celebrated as a land of marble and granite, the bedrock of New England also includes patches of sedimentary rock that document ancient landscapes and vegetation. From Earth’s deep Precambrian past dominated by bacterial photosynthesis, through the early history of land plants and tropical coal swamps of the Carboniferous Period, and on to warm temperate forests of 25 million years ago, and conifer forests established as ice age glaciers melted, New England rocks and fossils shed light on our region’s deep photosynthetic past.
Fee Free member, $10 nonmember

Offered in conjunction with Cambridge Science Festival. See more events at cambridgesciencefestival.org

Full list of classes available at my.arboretum.harvard.edu
**Good Fungus, Bad Fungus**

*John Klironomos, PhD, Professor of Biology, University of British Columbia—Okanagan*

Mon Apr 29  7:00–8:30pm  [HB]

Fungi may be found practically everywhere and play important roles in the environment. Some are decomposers (recyclers), others are parasites and pathogens, and yet others form mutualistic symbioses with plants and animals. In this presentation, the diversity and functioning of fungi in terrestrial ecosystems will be illustrated and discussed.

*Fee $10 member, $15 nonmember*

Offered with the Boston Mycological Club

**Global Environmental Threats: Why They Are So Hard to See and How Using a Medical Model Can Help**

*Eric Chivian M.D., Director, Program on Biodiversity and Human Health, Center for Health and the Global Environment, Harvard School of Public Health*

Wed May 1  7:00–8:30pm  [HB]

Tragically and self-destructively, we human beings have so much difficulty recognizing that we are an integral, inseparable part of the natural world and that we have no other choice but to preserve it. Our failure in understanding this fundamental truth is central to our difficulty in seeing the changes, happening before our eyes, that we are making to the global environment and in acting to prevent them. This talk shall look at why these alterations are so hard to see and how looking at their consequences from a medical perspective can be helpful.

*Fee $5 member, $10 nonmember*

**The Physical Fitness of Leaves**

*Steven Vogel, PhD, Research Professor, Duke University*

Thu May 30  7:00–8:30pm  [HB]

Every organism must contend with its immediate physical environment, a world that both limits what organisms can do and offers innumerable opportunities for evolving ways to challenge those limits. In exploring the leaf’s world, Steven Vogel simultaneously explores our own. He’ll answer questions about how objects get much hotter than air when in sunlight and far cooler when beneath a clear night sky; how air movement matters even when we can’t feel it; how trees avoid damage from storms; and ways leaves acquire the essential resources for growth and reproduction. Join us to learn about some of the extraordinary designs that enable a leaf to adapt to its physical world.

*Fee $10 member, $15 nonmember*

**Flash Night: Learning to Socialize with Fireflies**

*Sara Lewis, PhD, Professor of Evolutionary and Behavioral Ecology, Tufts University*

Wed Jun 5  7:00–8:30pm  [HB]

Come learn to eavesdrop on and even converse with fireflies. Anyone who’s ever been mesmerized by the luminous flashes of these tiny insects will enjoy this evening talk and walk led by Sara Lewis, who has been studying the natural history and behavior of fireflies for more than 20 years. Wear shoes appropriate for walking in damp, muddy areas and bring along a headlamp or small flashlight.

*Fee $10 member, $15 nonmember*

**Inventing Wine: A New History of One of the World’s Most Ancient Pleasures**

*Paul Lukacs, PhD, Professor of English and Director of the Center for Humanities, Loyola University Maryland*

Thu Jul 18  6:00–8:00pm  [HB]

Join us for a lecture and informal wine tasting with Paul Lukacs, professor by day and wine connoisseur by night. Paul will chronicle the 8,000 year history of wine, as spiritual and bodily nourishment to an everyday pleasure. Paul is the author of *Inventing Wine: A New History of One of the World’s Most Ancient Pleasures; American Vintage: The Rise of American Wine,* and *The Great Wines of America: The Top Forty Vintners, Vineyards, and Vintages.* He has been writing about wine and its cultural contexts for nearly twenty years. Attend the lecture and sample several vintages. (For registrants 21 and older).

*Fee $30 member, $40 nonmember*
Visit and Enjoy the Arnold Arboretum

Collections Up Close
Celebrate amazing, ephemeral plant phenomena

Collections Up Close offer great ways to explore plants at the Arboretum. Drop-in for a guided tour, pick up a paintbrush, look under a microscope, and chat with knowledgeable staff and volunteers. Check our website for the full schedule of activities for each event in the series, and look for more in the fall. Free.

Landscape Explorations
arboretum.harvard.edu/visit

Magnificent Maples
April 21, 1:00–3:00pm
Did you know that maples are among the first trees to flower each spring? Explore our world-class maple collection as flowers bloom and new leaves unfurl. Look for maple blossoms and bright new leaves—tiny, delightful signs of spring.

Lilac Sunday
May 12, 10:00am–4:00pm
Join lilac enthusiasts from all over New England to celebrate this century-old tradition. Enjoy a dazzling array of over 180 kinds of lilacs with delightful fragrances and gorgeous colors—plus tours, information, music, children’s activities, art and food (picnicking allowed on this special day only).

Rhododendron Ramble
June 2, 1:00–3:00pm
Stroll through Rhododendron Dell at the foot of Hemlock Hill and enjoy the diverse display of rhododendrons in bloom.

Interpreters
Weekends beginning April 13, 11:00am–3:00pm
As you stroll, look for friendly volunteers in green aprons. Volunteers are stationed outdoors, ready to give a boost to your visit with hands-on fun and learning. Free.

The Hunnewell Building is open for restroom and business guests access:

April through October
Weekdays: 9:00am to 6:00pm
Weekends: 11:00am to 6:00pm

The Visitor Center in the Hunnewell Building is open:

April through October, 11:00am to 6:00pm
Closed Wednesdays

See our website for holiday closings.

Services available in the Visitor Center include:

• Personal assistance to enrich your visit
• Membership information
• Maps and postcards
• Changing exhibits from the Arboretum archives
• A rotating selection of library books for browsing
• Seasonal art exhibitions
• Activities for children and families
• Lost and found; for inquiries, call 617.384.5209. Items unclaimed after two weeks are donated to charity.

Telephone: 617.384.5209

The Arnold Arboretum Horticultural Library is open to the public Monday through Friday, 10:00am to 3:45pm. For library information, visit our website, call 617.522.1086, or email hortlib@arnarb.harvard.edu.

Visitor Parking & Driving Permits
Visitor parking is available around the Arboretum’s perimeter. No parking is allowed inside the Arboretum gates. Individuals with special needs may request a driving permit at the Hunnewell Visitor Center on Monday, Tuesday, Thursday, or Friday between noon and 3:00pm, except holidays. For more information please call 617.384.5209.
Landscape architect David Valbracht turned to botanical illustration to develop a better method for identifying trees. A collections researcher with the Arboretum, David gathers plant samples from the landscape and arranges them in his studio as they grew in life. These “tree portraits” emphasize drawing as a method to develop observation and identification skills, and at the same allow for personal expression. The exhibition centerpiece is a thirty-foot mural illustrating over 100 species of trees, grouped according to the Arboretum’s landscape plan.

The Arboretum and the Boston Teachers Union School enjoy a unique partnership to develop observational skills and foster a love of science in every student from kindergarten through fifth grade. Through hands-on work and experiments with plants and animals, Arboretum staff guide students to create accurate, vivid illustrations, describe what they see using rich vocabulary, and learn important concepts in the life sciences. Works in this exhibition represent a range of ages, as well as the breadth of life science topics studied in the classroom, all seen through a child’s eye.

Exhibitions are displayed in the Hunnewell Building Lecture Hall, which is occasionally reserved for meetings and classes. Call 617.384.5209 for exhibition availability; see page 14 for Visitor Center hours.

Fun and Discovery on the Go

Be part of the Explorer’s Club! Borrow a Discovery Pack from the Visitor Center with tools and activities for hands-on nature and science exploration with children. Perfect for families, homeschoolers, and after-school groups. Free.

Plant Information Hotline

Run by knowledgeable volunteers, our plant hotline is available for questions about woody plants hardy in the Boston area. Live every Monday from 1:00–3:00 pm, or leave a message any time. Call 617.384.5235 or send an email to plantinfo@arnarb.harvard.edu.
Free Tours

Free tours begin in front of the Hunnewell Building unless otherwise noted, last approximately 90 minutes, and are geared toward adults. Free tours are for individuals, not organized groups. Private group tours are also available; see my.arboretum.harvard.edu. For more information, or cancellations due to inclement weather, call 617.384.5209.

General Tours

These tours offer a window into the Arboretum’s history, special collections, seasonal highlights, and current programs. No need to register.

Starting April 13, we will offer general tours:
- Saturdays at 1:00pm
- Sundays at 1:00pm

From April 30 to May 30, look for additional general tours:
- Tuesdays and Thursdays at 1:00pm
- Saturdays and Sundays at 3:00pm

International Tours

The Arboretum grows plants from around the globe, so it is fitting to talk about them in many languages. This June, look for tours each Saturday and Sunday at 2:00pm in languages like Spanish, Chinese, and Russian. Great for non-English speakers and those practicing foreign language skills. Check our website for the full schedule and language options.

Theme Tours

Theme tours cover a specific subject or area of the collection. Registration is requested; go to my.arboretum.harvard.edu for descriptions and registration information. Meet at the Hunnewell Building [HB] unless otherwise specified.

From Seed to Tree
Staff of the Arboretum’s Dana Greenhouses
1st Tuesdays, Apr–Sep, 1:00–2:00pm [Dana Greenhouses]

Birding 101
Bob Mayer, Arboretum Docent
Apr 20 [HB], Apr 27 [Peters Hill Gate], May11 [HB], May 19 [South Street Gate]; 8:00–9:30am

Arbor Day Planting and Tour
Stephen Schneider, Director of Operations
Apr 26, 1:15–2:30pm

Spring into Health
Rhoda Kubrick, Arboretum Docent
Apr 28, 9:00–10:30am

Flowers Change
Nancy Sableski, School Programs Manager
May 9, 3:00–4:30pm

Learning From Leaves
David Valbrecht, artist, and Maggie Redfern, Visitor Education Assistant
May 19, 2:00–3:30pm

A Sensory Stroll
Kevin Schofield, Arboretum Docent
Jun 16, 3:00–4:30pm

The Hidden Forest: Fungi at the Arboretum
Susan Goldhor, Biologist and President, Boston Mycological Club; Joel Kershner, Arboretum Field Studies Guide
June 29, 2:30–4:00pm [Bussey Street Gate]

Exciting Introductions or Stealth Invaders?
Marty Amdur, Arboretum Docent
Aug 24, 11:00am–12:30pm

A Year in the Leventritt Garden
Rachel Brinkman, Horticultural Apprentice
Sep 8, 2:00–3:00pm [Leventritt Garden]

Weld Hill: Science and Sustainability
Julie Warsowe, Manager of Visitor Education
Sep 10, 2:00–3:00pm [Weld Hill]
Marvel at the Beauty of Spring
Members' Tour Day at the Arnold Arboretum
Saturday, April 27 at 9:00am

What's Happening?
Each spring the Arnold Arboretum invites members of the Friends of the Arnold Arboretum to join our knowledgeable staff for walking tours of the Arboretum and its remarkable living collections. This special event offers a wonderful way to experience spring and learn about what’s in bloom in the awakening landscape.

Where is it, and when?
The event will be held on Saturday, April 27 from 9:00am to noon beginning at the Hunnewell Building directly inside the Arborway Gate.

How do I get there or learn more?
Visitor parking is available along the Arborway. MBTA access from Forest Hills Station. A postcard reminder will be mailed prior to the events. Find detailed information and directions on our web site at arboretum.harvard.edu.

What else should I know?
The event starts in the Hunnewell Building with registration and refreshments in the newly renovated Visitor Center from 9:00 to 9:45am. Tours led by Arboretum living collections staff will depart beginning promptly at 10:00am. Each tour will last approximately two hours and may cover a considerable distance. Be sure to dress for the weather, wear comfortable walking shoes, and bring a refillable water bottle. For the safety and comfort of all participants, please leave pets at home.

How do I sign up?
Event is open to current members (expiration date of April 30, 2013 or later) at all levels. Please RSVP by April 19. You may register on our website at my.arboretum.harvard.edu (or link from our homepage), or contact the membership office at 617.384.5766 or membership@arnarb.harvard.edu.

Members Make a Difference
Be a partner in all we do! Members of the Friends of the Arnold Arboretum provide essential support for the ongoing stewardship of our remarkable collections and historic landscape, research initiatives, and education and enrichment programs for all ages. Your annual membership contribution and involvement provides the foundation for all of this important work.

We hope you enjoy your Arboretum membership and the experiences it offers. Share your enthusiasm and help support the Arboretum’s mission by giving a gift membership to a family member or friend. To learn more, please contact the membership office by calling 617.384.5766 or emailing membership@arnarb.harvard.edu, or visit our website and select the "Donate" button at the top of our homepage.
A Rugged and Resplendent Rhody

Kyle Port, Manager of Plant Records

Over the past seven years, Arboretum horticulturists have successfully revitalized Beatrix Farrand’s Azalea Border design by nurturing a number of established and new plantings. A total of 45 Rhododendron taxa (kinds) represented by more than 140 plants flower in lavish hues between April and July. Among these, Rhododendron molle ssp. japonicum (260-2007*A), Japanese azalea, bears yellow flowers of singular brilliance in May. Each dorsal petal of the broadly funnel-shaped flowers is blotched with green, offering an enticing tonal contrast. These ornamental qualities along with winter hardiness have enticed hybridizers to breed Japanese azalea with other Asian, European, and North American rhododendron. Many azalea cultivars grown by the Arboretum are suspected to have R. molle ssp. japonicum in their parentage.

The direct source of our handsome specimen can be traced to George Hibben who selected an open pollinated seedling from a plant in his garden. George’s plant grew from hand-pollinated seed that Dr. Uno Paim of Fredericton, NB, Canada, made available to the American Rhododendron Society (ARS) in 1990. Although many hands and possible pollen parents are implicated in the lineage of our fine specimen, the hardiness (noted by ARS to be -25 Fahrenheit) and traits of this R. molle ssp. japonicum are evident. Curatorial investigation into the deep history of our accession is ongoing with a goal to identify all seed and pollen parents.

A dedicated volunteer at the Arboretum since 1988, George joins a distinguished list of Rhododendron hobbyists, hybridizers, and institutional partners who have collaborated with Arboretum staff to develop our outstanding collection. His passion for the genus extends to his own garden selections and longtime involvement with celebrated institutions: the Massachusetts Chapter of the American Rhododendron Society has honored George with numerous awards and his descriptions of two hybrids—‘Dick Brooks’ and ‘Robert Stuart’—have been published in The International Rhododendron Register and Checklist of the Royal Horticultural Society, UK.

Visit the Arboretum this spring to see R. molle ssp. japonicum and many other striking azaleas in bloom. On June 2, join us for Collections Up Close: Rhododendron Ramble, featuring tours and activities spotlighting the diversity of large-leaved evergreen specimens in Rhododendron Dell.