



The **ARNOLD**
ARBORETUM
of HARVARD UNIVERSITY



COLLECT STUDY SHARE STEWARD

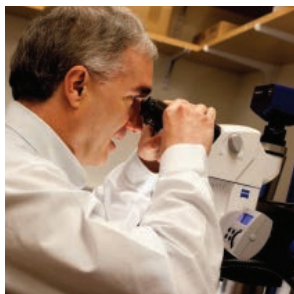
ANNUAL REPORT 2016



Who We Are

Founded in 1872 as the first public arboretum in North America, the Arnold Arboretum of Harvard University is a leading center for the study of plants and biodiversity.

A 281-acre preserve laid out by pioneering American landscape architect Frederick Law Olmsted, the Arboretum stewards one of the world's most comprehensive and best documented collections of temperate woody plants, with particular focus on the floras of eastern North America and eastern Asia. The Living Collections, herbarium specimens, and library and archives support research as well as public programs for all ages. Open free every day, this jewel in the Emerald Necklace park system is among Boston's most beloved open spaces.



FROM THE DIRECTOR

William (Ned) Friedman
Director of the Arnold
Arboretum, Arnold Professor
of Organismic and Evolutionary
Biology and Faculty Fellow of
Harvard University

As I look back at 2016—a year fraught with serious challenges around the world and deep divisions in our own nation—I am reminded of the critical importance of institutions like the Arnold Arboretum. From the work of our scientists who study how global change affects plants to providing a safe environment for families to learn about nature, the Arboretum exists to expand knowledge and to inspire discovery. What we stand for, both today and in the future, are the four essential principles that have characterized the Arnold Arboretum from its very beginnings.

First, we are committed to protecting and celebrating global biological diversity. In 2016, the first full year of our Campaign for the Living Collections, the Arboretum traveled to China, the Republic of Georgia, and multiple U.S. states to expand the scope and value of the collected plants we preserve for study and conservation. With one in every five plant species in the world threatened with extinction, this work will continue to be a top priority.

Second, we address our responsibility to work towards social and economic justice. I am proud

that the Arboretum—in partnership with the City of Boston and Harvard University—is one of the only major botanical gardens to be free and open to the public every day of the year. Our educational outreach to children from Boston Public Schools, as well as the many free learning programs we offer for adults, extend from the notion that we are an agent for social good and human enrichment.

Third, we honor a commitment to rationalism and fact-based science inquiry. While the value of science and the realities of global change have become unlikely topics for national debate, the Arboretum has significantly expanded its resources for research and its engagement with scientists from around the world through awards, fellowships, and internships.

Finally, the Arboretum continues to strive to provide the finest horticultural and landscape care. With a remarkably talented staff and fresh leadership, our living collections team has greatly improved the stewardship of both our plants and our Olmsted-designed grounds. We remain focused on making progress in our ambition to provide global leadership in the documentation, care, and display of institutional plant collections.

I find the greatest pleasure in spending time in this landscape, getting to know our collections and observing the fascinating interplay of evolution and environment at work every day here. By sharing ephemeral moments of beauty and wonder in the life cycles of our plants—whether in my “Posts from the Collections” emails, at our Tree Mobs, or a photograph shared on social media—I hope to open eyes, hearts, and minds to the beauty and value of the natural world. As always, I am grateful for the role you play in helping us honor the important values we share.

April 22, 2016

Arboretum Horticulturists begin planting almost 350 new plants in the landscape, some of which represent the first of their species to grow at the Arnold Arboretum, such as Southern live oaks (*Quercus virginiana*) collected by Michael Dosmann in 2012.



March 21, 2016

Head of Library and Archives Lisa Pearson publishes *Arnold Arboretum*, depicting the history of the Arboretum in nearly 200 archival photographs.

(See page 20)

May 8, 2016

Visitors from all over Boston and the northeast flock to the Arboretum for Lilac Sunday. Celebrated since 1908, the beloved annual festival centers around the Arboretum's one-of-a-kind collection of over 165 types of lilacs (*Syringa* spp.).

May 9, 2016

The Arboretum's 2016 Isabella Welles Hunnewell Interns begin their horticultural training program, with a group project focused on collections development in the area along Valley Road known as the "Rockery."



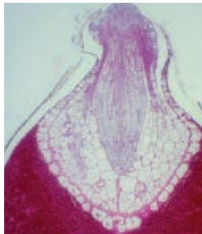
June 12, 2016

Pulitzer Prize winning composer John Luther Adams' *Inuksuit* is brought to life by over 90 musicians moving through the Arboretum landscape, making for a unique and immersive experience for thousands of spectators.

(See page 19)

August 2016

Jessica Savage, PhD, who studied vascular function in flowering species at the Arboretum as the 2014-16 Katharine H. Putnam Fellow, begins new faculty position in the Biology Department of the University of Minnesota, Duluth.



June 13-24, 2016

The Arboretum hosts student scientists from around the world for an intensive laboratory and lecture course at Weld Hill—the Summer Short Course in Organismic Plant Biology—in association with microMORPH and the National Science Foundation.



August 25, 2016

The Arboretum concludes "Plants in the Web of Life"—its first Summer Institute for Boston Public School educators, focused on helping elementary school teachers incorporate more science in and out of the classroom.

(See page 20)

December 8, 2016

The LEED® Gold certified Weld Hill Research Building at the Arnold Arboretum and two new solar power installations contributed to Harvard meeting a historic climate goal set in 2008—reducing greenhouse gas emissions across the University by 30%.

September 21-October 20, 2016

Arboretum staff mount plant-collecting expeditions internationally in China's Sichuan Province and the Republic of Georgia, and domestically in eastern Kentucky and four national forests in Tennessee, North Carolina, and Georgia (U.S.) as part of the Arboretum's Campaign for the Living Collections.

(See page 10)



RESEARCH

112

SCIENTISTS
USING THE
RESEARCH
LABS



40

SCIENTIFIC
PUBLICATIONS



55

NEW
PROJECTS
USING THE
COLLECTIONS

FACULTY FELLOWS

Starting in 2011, the Arboretum and the Harvard University Department of Organismic and Evolutionary Biology (OEB) jointly hired three faculty members, William (Ned) Friedman, Elizabeth (Lizzie) Wolkovich, and Robin Hopkins, whose research programs are based at the Arnold Arboretum.

As their official appointments and titles were through OEB, their contributions and essential functions to the Arboretum's research and educational programs were not officially acknowledged. Working with the Provost's office, the Arboretum created a new appointment in 2016: Faculty Fellows of the Arnold Arboretum of Harvard University.

In addition to our three faculty members, the appointment was granted to two additional Harvard Faculty, OEB Professor N. Michele (Missy) Holbrook and Graduate School of Design Assistant Professor Rosetta Elkin, to formally acknowledge their essential contributions to scholarship at the Arboretum.



ELKIN LAB

Rosetta Elkin's research focuses on bringing plants back to the center of the discussion of landscape architecture. Rosetta's course, Field Methods and Living Collections (DES 3356), utilizes the entirety of the Arnold Arboretum as a field site.

FRIEDMAN LAB

The laboratory of William (Ned) Friedman (pictured below with Robin Hopkins and Elizabeth Wolkovich) primarily focuses on reconstructing the evolutionary origin and diversification of flowering plants.

HOLBROOK LAB

Scholarship in the lab of Noel Michele Holbrook focuses on the comparative physiology of woody plants and how the transport of water and solutes through the vascular system influences ecological, evolutionary, and physiological processes.

HOPKINS LAB

Research in the laboratory of Robin Hopkins focuses on adaptation and the drivers of population and species divergence in plants.

WOLKOVICH LAB

Elizabeth Wolkovich's research centers around how global change alters plant communities. Her lab investigates recent shifts in the timing of phenological events such as leaf-out and flowering.

2016 ARNOLD ARBORETUM-FUNDED RESEARCH FELLOWSHIP AND AWARDS

KATHARINE H. PUTNAM FELLOWSHIP IN PLANT SCIENCE

Kasia Ziemińska
Putnam Fellow
Arnold Arboretum

The role of fibers and parenchyma in tree hydraulics

ASHTON AWARD FOR STUDENT RESEARCH

Meghna Krishnadas
PhD candidate
Yale University

Living on the edge: Mechanisms of tree diversity loss due to edge effects in fragmented rainforests of Western Ghats, India

DELAND AWARD FOR STUDENT RESEARCH

Jonathan Mahoney
Master's student
University of Connecticut

Breeding the next generation of anthocyanin-rich pome fruits

Alexander Susko
PhD candidate
University of Minnesota

Targets of selection and environmental association in *Rhododendron* sect. *Pentanthera*

SHIU-YING HU STUDENT/POSTDOCTORAL EXCHANGE AWARD

Meng Li
PhD student
Chengdu Institute of Biology
Chinese Academy of Sciences

Evaluating how hybridization has contributed to species diversification of *Sorbus*

JEWETT PRIZE

Danilo Fernando
Associate Professor, State
University of New York

Flower and fruit development in *Actinidia arguta*

Adam Roddy
Post-doctoral Fellow
Yale University

Tradeoffs in hydraulic strategies among basal angiosperm flowers

SARGENT AWARD

Kuo-Fang Chung
Biodiversity
Research Center
Academia Sinica, Taiwan

Systematics of *Berberis*

Dan Sullivan
Visiting Fellow
Arnold Arboretum

Characterization of a rapid DNA extraction procedure

SINNOTT AWARD

Callin Switzer
PhD candidate
Harvard University
Hopkins Lab

The pollen catapult of *Kalmia* spp.: Does it miss the target?

HOW MUCH NITROGEN IS IN THE AIR?

High rates of atmospheric deposition of nitrogen from power plants, automobile exhaust, and fertilizers can lead to negative consequences including reductions in plant diversity, acidification of soils and waterways, and harm to human health. In 2016, we partnered with Arboretum Associates Pamela Templer and Lucy Hutyra to establish an atmospheric deposition monitoring site at Weld Hill to measure rates of atmospheric deposition in the City of Boston. Made possible through a gift from the DaRin Butz Foundation, the Arboretum is now one of only two urban sites in the National Atmospheric Deposition Program (NADP).

Photo by Callin Switzer



PERSISTENT POLLINATORS

Callin Switzer, 2016 Edmund Sinnott Collections Training Award Recipient and Fellow of the Arnold Arboretum

Focused on the interactions between bees and flowers that result in plant pollination, Callin Switzer's research in the Hopkins Lab investigated the bumble bee (*Bombus* sp.) and its unique method of vibration for pollen extraction.

Callin observed one particular species in the Arboretum—the mountain laurel (*Kalmia latifolia*)—with a distinctive pollen release system. The flower petals open holding the filaments in tension. When pollinators jostle the filaments, the motion releases the anthers and catapults pollen. Callin's research tested whether this complex phenomenon is an effective means for mountain laurels to attach pollen to pollinating insects.

"The diversity of the Arnold Arboretum's Living Collections combined with the knowledge of the curatorial staff and scientists allowed me to conduct my project quickly and effectively," noted Callin.

A NEW SPECIES OF TRUFFLE

In June, Rosanne Healy (2013 Sargent Award recipient) and colleagues detected eight truffle species (genus *Tuber*) in the root communities of Arboretum trees. One of these eight was a brand new species previously unknown to science. In honor of the location of its discovery, the researchers named the truffle *Tuber arnoldianum*.

The *Boston Globe* noted the sense of wonder evoked by the discovery of a new species in a place populated by scientists, where every inch of the soil is studied and documented. And, in answer to a popular question, *Tuber arnoldianum* is not good for eating.

Photo by Rosanne Healy



Campaign for the LIVING COLLECTIONS

Kentucky

In September 2016, Living Collections Fellow Jenna Zukswert participated in a plant collecting expedition to Daniel Boone National Forest in eastern Kentucky in search of *Stewartia ovata* (right). Along with collections from 18 populations of this species, the trip yielded several other species from the Campaign target list, including *Malus angustifolia* (southern crabapple), a new species to the Arboretum.



Southern Appalachia

A collecting hotspot due to its high biodiversity, Southern Appalachia provided Living Collections Fellows Robert Dowell and Jenna Zukswert with over a dozen species on their week-long expedition. Collaborating with local experts, Jenna and Robert traveled through four national forests in Tennessee, North Carolina, and Georgia. Among their collections was *Magnolia macrophylla* (bigleaf magnolia, right).



New Hampshire

In June 2016, Hunnewell Interns and Living Collections Fellows traveled with Manager of Horticulture Andrew Gapinski to White Mountain National Forest, New Hampshire for a unique training experience. Interns tested their plant identification skills and learned how to gather plant material destined for the Arboretum's Living Collections. Accessions from the trip included *Populus tremuloides* (quaking aspen, being collected above).





5
PLANT
COLLECTING
EXPEDITIONS



195
SPECIES
COLLECTED



347
PLANTS
ADDED TO THE
LANDSCAPE



Republic of Georgia

In October 2016, Manager of Horticulture Andrew Gapinski and Director of Operations Stephen Schneider traveled through the Republic of Georgia on an 11-day expedition, a follow-up to a scouting and planning trip earlier in the year. Working with partners from the National Botanical Garden of Georgia and Batumi Botanical Garden, Andrew and Steve collected several important species for the Campaign, including *Fagus orientalis* (Oriental beech, above). The richness of the region's flora, history, and natural beauty will surely invite another expedition in the future.



Sichuan Province, China

In September 2016, Curator of Living Collections Michael Dosmann and colleagues joined the North America-China Plant Exploration Consortium (NACPEC) expedition to the Huanglong Nature Preserve (a UNESCO World Heritage Site) in the Sichuan Province of China. With a climate similar to our own, China and other areas of eastern Asia have proven to be excellent sources for studying plant diversity and collecting plants that can thrive at the Arboretum. Among the species collected were *Dipteronia sinensis* (Chinese money maple) and *Viburnum schensianum* (Shensi viburnum, above).



GLOBAL PARTNERSHIPS

Recognizing the need for international cooperation in preserving biodiversity, the Arnold Arboretum signed two new collaborative agreements in 2016 for plant collection and conservation as part of the Campaign for the Living Collections. Historically, the Arboretum has specialized in growing and studying temperate woody plants from China, partnering with Chinese botanists and naturalists to explore and document the flora of China since 1905. This long relationship gained new strength last fall through an agreement for joint seed and plant collecting expeditions and integrated conservation activities with the Beijing Botanical Garden.

In October, Director of Operations Stephen Schneider and Manager of Horticulture Andrew Gapinski collected plants in the Republic of Georgia, and finalized a memorandum of understanding (below) for plant collections, exchanges, and study with Batumi Botanical Garden on Georgia's Black Sea.



EXPANDING AN UNPARALLELED COLLECTION

The Living Collections are central to all research, education, public engagement, and conservation initiatives at the Arnold Arboretum.

With an eye on the Arboretum's sesquicentennial in 2022 and the increasing urgency to study and protect Earth's natural heritage, the Campaign for the Living Collections seeks to expand the legacy of this extraordinary collection and ensure its future.

Launched in the fall of 2015, this 10-year initiative targets 388 species from all over the world for acquisition, including 177 not currently represented in the collections.

Over its course, the campaign seeks to raise \$5 million to endow these efforts to help scientists address the challenges of the coming century—climate change, habitat destruction, and species extinction—by preserving and documenting biodiversity.

In 2016, the campaign's second year, the Arboretum forged new partnerships, expanded its fundraising efforts, and acquired 195 species. Of these, 105 were collected on expeditions in 2016, and 53 are species from the Campaign target list (or *desiderata*).



Arnold Arboretum Library Reading Room. Photo by Ralph Lieberman

LIBRARY ADVISORY BOARD

The inaugural meeting of the Library Advisory Board was held in December 2016 and introduced two major initiatives for scholarship enhancement. The Charles Sprague Sargent Scholarship Initiative will highlight the contributions of the Arboretum's founding director to the development of the Arboretum, the conservation movement, and American botanical and horticultural thought. The Initiative to Study the History of Plant Exploration will examine the Arboretum's role in global discovery, leveraging institutional records, manuscripts, expedition notebooks, and photographic images.

IN OUR LIVING COLLECTIONS



2,130 Species

3,828 Taxa*

10,589 Accessions**

14,562 Individual plants

IN OUR HERBARIA



129,199 Specimens in the
Herbarium of Cultivated Plants
at the Arnold Arboretum

1.5 million Specimens in the
Harvard University Herbaria

IN OUR HORTICULTURAL LIBRARY



21,974 Books

350 Archival Collections

65,675 Photographs & videos

*Includes plant species, subspecies, varieties, formae, cultivars, and hybrids

**A plant (or plants) of one name obtained from one location on a given date through one mode of propagation

A photograph of a park during autumn. The foreground is dominated by the branches of a tree with vibrant, reddish-brown leaves. In the background, a couple is walking on a path, their figures blurred. The ground is a lush green lawn, and the overall scene is bathed in soft, natural light.

IN THE LANDSCAPE



Isabella Welles Hunnewell Interns learn how to prepare plants to transition from the Dana Greenhouses nursery into the landscape.

GAINING GROUND

With the Campaign for the Living Collections acquiring new plants and the development of the Landscape Management System underway, the Arboretum is exploring new ways to “gain new ground” in the landscape to accommodate our expanding collections.

In 2016, we began clearing space in the conifer and hickory (*Carya*) collections that had been gradually overtaken by the adjacent woodland. Hunnewell Interns also made progress in the “Rockery”—an area with exposed rock outcroppings along Valley Road—taking advantage of the unique geology to build an environment for species adapted to rocky mineral soils.

LANDSCAPE MANAGEMENT SYSTEM

With the Campaign for the Living Collections as a catalyst, the Arboretum inaugurated a comprehensive audit of plant health care and landscape management practices to ensure exemplary standards and strive for sustainable approaches.

Building upon the Landscape Management Plan (our guiding document from 2007 to present), the new comprehensive Landscape Management System (LMS) will transform how we coordinate care for Arboretum plants and landscapes. Using a digital platform and an integrative approach, the LMS will articulate horticultural priorities, facilitate communication with internal stakeholders and external contributors, and evolve as the environment and our knowledge change.

By better integrating data, supporting mobile device recording of observations in the field, and centralizing horticultural initiatives, the new LMS will increase our capacity for evidence-based decision-making in the landscape and greatly enhance the care of our living collections.

NEW APPROACHES TO LANDSCAPE & COLLECTIONS CARE

PEST MANAGEMENT: PROGRESS THROUGH PARTNERSHIP

With the motivating principle of supporting the health of the Living Collections in mind, the Arboretum increased its commitment to collaborate with external experts to better understand the conditions that affect the health of the collections.

Working with Professor Joseph Elkinton of the University of Massachusetts, Arboretum horticulture staff investigated biological controls for winter moth, supporting research that will inform sustainable management decisions for dealing with this pervasive pest.

Improved documentation of pests and diseases affecting the Living Collections through the Landscape Management System will also help ensure the long-term health and preservation of this critical resource for research and horticulture.



SOILS AND ORGANIC RECYCLING

Among the dozen landscape-wide programs outlined in the new Landscape Management System is a focused soils program to evaluate soil health and methods for improving it.

In 2016, the Arboretum invited seven external experts to join a Soils Advisory Committee to help us better understand qualities of our soils and ensure optimum growing conditions for plants acquired as part of the Campaign for Living Collections.

We also initiated a re-design of our compost system to help efficiently and effectively transform our horticultural wastes into a valuable soil amendment, and tested the use of cover crops such as tillage radish on the grounds to reduce soil compaction.

Left, Director William (Ned) Friedman displays the array of insect species collected from Arboretum trees through a research partnership with the US Forest Service. The initiative is helping to reveal the associations between pests and their hosts plants, and enable staff to determine the best strategy to address concerns. It also serves a broader ecological mission of identifying insect species moving into New England, and potentially through North America, to inform policy and management decisions on a national scale.

Photo by Harvard Staff Photographer Kris Snibbes, originally published by *Harvard Gazette*.

HORTICULTURAL EXPERTISE

As one of the world's premiere botanical institutions, the Arnold Arboretum is committed to achieving the highest standards of plant care and horticultural display. Toward this goal, we broadened our capacity in 2016 through the addition of a new Assistant Manager of Horticulture, two Living Collections Fellows, and three new seasonal gardener positions.

Our increased people power helped us plan and facilitate several significant projects to advance our management strategies and to continue striving for the highest caliber of care for our collections and landscape. Strengthening our team has contributed fresh perspectives and new skill sets which generated increasingly positive impacts on our operations throughout 2016.



Horticulture team with Isabella Welles Hunnewell Interns, class of 2016

PIONEERING PLANT CARE

CULTIVATING CAREERS

TRAINING TOMORROW'S LEADERS

The Arboretum's programs in horticultural training and education allow students and rising professionals to advance their knowledge and expertise and pursue the highest standards in their future careers.

In 2016, students in the Arboretum's Norfolk Agricultural High School Practicum planted native wildflower species to create habitat for pollinators in the conifer collection, while the Isabella Welles Hunnewell Interns completed a plan for site improvement and collections development along Valley Road.

Additionally, the two newly added Living Collections Fellows worked to steer key curatorial and horticultural aspects of the Campaign for the Living Collections.



EDUCATION
&
COMMUNITY



198 TOURS

OF SEASONAL LANDSCAPE HIGHLIGHTS, LED BY STAFF AND DOCENTS



57 CLASSES

PLUS LECTURES, WORKSHOPS, AND TREE MOBS™ ON TOPICS FROM CLIMATE CHANGE TO PLANT PROPAGATION



3,298 STUDENTS

LEARNING IN THE LANDSCAPE ON FIELD STUDY EXPERIENCES AND SCHOOL TRIPS

INSPIRING CITIZEN SCIENCE

A series of free events called Botany Blasts encouraged a closer look at the changing characteristics of trees during the winter and early spring, covering scientific topics that helped participants understand how their own observations of nature may contribute to environmental action.

The series kicked off in January with Margaret Kosmala, a Post-doctoral Fellow in the Richardson Lab at Harvard University, who presented her work studying the dynamics of natural systems from local to continental scales. Arboretum Director William (Ned) Friedman helped the crowd visualize form and function in plant development with stunning macro photographs, and Boston University Professor Richard Primack drew connections between historical records and our understanding of climate change today. Arboretum Manager of Horticulture Andrew Gapinski closed the series with a talk about the threats facing Arboretum trees, including pests, diseases, and drought.

VISITORS SEE THE COLLECTIONS UP CLOSE

Free and open to the public, Collections Up Close events focus on one area or generic grouping of plants, inviting in-depth reflection on the collections from knowledgeable staff and volunteers.

This year, a Collections Up Close event highlighting the Bonsai and Penjing Collection offered visitors entry into the pavilion to view our celebrated collection of dwarfed potted plants, including the newly unveiled collection donated in 2015 by Martin Klein. A second Collections Up Close opportunity in the Explorers Garden encouraged visitors to “be an explorer for a day” with activities and staff-led tours of plants acquired on collecting expeditions.



Inuksuit at the Arboretum. Photo by Adam DeTour



BOSTON PREMIERE OF *INUKSUIT*

On June 12, 2016, the Arboretum hosted a truly memorable performance of *Inuksuit*, a multi-percussion piece composed by Pulitzer Prize winner John Luther Adams. Performed by over 90 musicians scattered throughout the Arboretum landscape, *Inuksuit* was an interactive, ethereal, and unforgettable experience. From Bussey Hill to the Conifer Collection and to the edge of Bussey Brook, drums echoing off the hills mixed with bird calls, flute, and the reactions of over 3,000 spectators who were encouraged to roam and interact with the performance.

Named one of the “Top 10” classical music events of the year by the *Boston Globe*, this unique collaboration was orchestrated by Maria Finkelmeier of Kadence Arts, Amy Garapic of the percussion trio TIGUE, and Pam Thompson, Manager of Adult Education at the Arnold Arboretum.

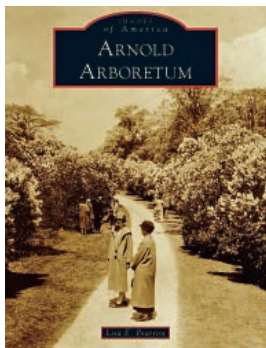
ART AT THE ARBORETUM

From the instructive paintings of Frank Rines, to Gunars Viksnins' photographs of Bussey Brook through the seasons, to intimate portraits of trees by Jennifer Weigel, 2016 brought an exceptionally strong and diverse collection of art exhibitions to the Arboretum.

While the New England Society of Botanical Artists displayed exquisite watercolor and pastel interpretations of New England's woody plants, The Art of the Woodturner brought together three local woodturning associations to showcase the beauty of trees through a different lens. Talks, demonstrations, and walks through the landscape with artists provided further opportunities for the public to experience the Arboretum anew through the creative vision of New England artists.

Bussey Brook by Gunars Viksnins





HISTORY THROUGH PHOTOGRAPHS

March 2016 saw the publication of *Arnold Arboretum*, part of Arcadia Publishing's "Images of America" series. Compiled and annotated by Head of the Library Lisa

Pearson, the book depicts the story of the Arnold Arboretum in nearly 200 photographs, from its days as a colonial era estate, to its founding in 1872, and its development as a world-class botanical institution. In addition to striking images of the Arboretum landscape and collections over the past 145 years, the book also illustrates science and education programs, highlights changes in horticulture, and profiles notable staff and plant explorers.

BENCH DEDICATION PROGRAM

In a noteworthy amendment to its 1885 charter with the City of Boston, the Arnold Arboretum assumed full control over the installation and care of park benches throughout its 281-acre landscape. The new Commemorative Bench Program aims to replace all existing Arboretum benches through donor support, providing opportunities to honor a special person or occasion. Utilizing wood from felled or deaccessioned Arboretum trees, the new benches create a strong link to the collections both past and present, enhance the visitor experience, and provide financial support for the institution.

TEACHING & LEARNING IN THE LANDSCAPE

Through support from the Henry Meyer Boston School Initiative, the Arboretum expanded its partnership with Boston Public Schools to offer hands-on learning opportunities for teachers as well as students. Monthly explorations in the landscape help educators develop a greater understanding of the plant world and offer strategies for incorporating plant science into classroom and outdoor teaching.

In August, educators from nine Boston Public Schools as well as surrounding neighborhoods participated in a four-day workshop focused on gaining and sharing knowledge of life science. The 2016 Summer Institute, *Plants in the Web of Life*, offered activities, resources, lesson ideas, and expertise to enable teachers to align their science curricula with the new Massachusetts Science, Technology, and Engineering Standards. The Summer Institute also allowed teachers to benefit from self-directed time in the Arboretum with group explorations of plant diversity in various areas of the landscape, strengthening their familiarity with nature and plant science.



Summer Institute teachers examine ferns. Photo by Nancy Sableski

PEOPLE

CALENDAR YEAR 2016: JANUARY 1, 2016 - DECEMBER 31, 2016

Arboretum Staff

ADMINISTRATION & OPERATIONS

- John Barbosa, Custodial Crew Chief
- Donna M. Barrett, Accounting Associate
- William (Ned) Friedman, Director of the Arnold Arboretum, Arnold Professor of Organismic and Evolutionary Biology and Faculty Fellow at Harvard University
- Edin Guerra, Custodian
- Kimberly Hall, HR/Payroll Coordinator
- Donna Heimlich, Senior Human Resources Consultant
- Matthew Jordan, Director of Finance
- Karen Lacourse, Special Assistant
- Cesar Mieses, Associate Director of HR
- Karen Pinto, Staff Assistant
- Alison Ring, Special Assistant to the Director
- David J. Russo, Facilities Manager
- Stephen Schneider, Director of Operations and Public Engagement
- Tracy Smith, Assistant Facilities Manager

CURATION

- Michael Dosmann, Curator of Living Collections
- Robert Dowell, Living Collections Fellow

- Irina Kadis, Curatorial Assistant
- Kyle Port, Manager of Plant Records
- Kathryn Richardson, Curatorial Assistant

EDUCATION & PUBLIC PROGRAMS

- Catherine Cremin, Visitor Engagement Staff
- Ana Maria Caballero McGuire, Children's Education Fellow
- Ana Eder-Mulhane, Visitor Engagement Staff
- Regina Mission, Visitor Engagement Staff
- Nancy Sableski, Manager of Children's Education
- Kate Stonefoot, Manager of Visitor Engagement
- Pamela Thompson, Manager of Adult Education
- Sheryl L. White, Coordinator of Visitor Engagement

EXTERNAL RELATIONS & COMMUNICATIONS

- Jon Hetman, Director of External Relations & Communications
- Wendy Krauss, Membership Coordinator

- Barbara Murphy, Development Assistant
- Nancy Rose, Editor of *Arnoldia*
- Meghana Srinivasan, Marketing and Communications Specialist

GREENHOUSES

- John Herbert Alexander III, Plant Propagator
- Troy Eilertson, Seasonal Greenhouse Assistant
- Tiffany Enzenbacher, Supervisor of Plant Production, Manager of Plant Production
- Bob Famiglietti, Greenhouse Horticulturist
- Sean Halloran, Plant Propagator
- Jennifer Rioux, Seasonal Greenhouse Assistant

HORTICULTURE

- Rachel Brinkman, Horticulturist, Assistant Manager of Horticulture
- Kelly Burja, Seasonal Gardener
- John S. DelRosso, Head Arborist
- Robert Ervin, Arborist
- Kirsten Ganshaw, Horticulturist
- Andrew Gapinski, Manager of Horticulture
- Scott Grimshaw, Horticulturist

- Conor Guidarelli, Horticultural Technologist
- Dennis Harris, Horticulturist
- Wesley Kalloch, Horticulturist
- Brendan Keegan, Seasonal Gardener, Gardener I
- Gregory LaPlume, Horticultural Technologist, Horticulturist
- Lenna Ostrodka, Seasonal Gardener
- James Papargiris, Working Foreperson
- Susanne Pfeiffer, Horticulturist
- Jed Romanowiz, Gardener II, Horticultural Technologist
- Nima Samimi, Gardener II
- Kyle Stephens, Arborist
- Mark Walkama, Horticulturist
- Jenna Zukswert, Living Collections Fellow

ISABELLA WELLES HUNNEWELL INTERNS

- Giovani Almeida Camargo, Universidade Estadual de Ponta Grossa; Western Kentucky University
- Adam Banks, University of Massachusetts Amherst
- Adam Beck, University of Massachusetts Amherst
- Alessandro Ferzoco, Harvard College
- Jordan Morgan, Niagara Parks Commission School of Horticulture
- Connor Ryan, Auburn University
- Brenna Scheiderer, Ohio State University
- Danny Schissler, Tufts University; Massachusetts College of Art and Design

- Natalie Buckley-Medrano, University of California, Santa Barbara
- Wyatt Dixon, Miami University
- Brian Pruksa, Iowa State University; University of Wisconsin-Madison

INFORMATION TECHNOLOGY

- Stephen Hill, IT Systems Administrator
- Victoria Wei Lin, Database Specialist
- George Morris, Director of Information Technology
- Donna Tremonte, Applications Programmer

LIBRARY

- Larissa Glasser, Library Assistant
- Lisa E. Pearson, Head of Library & Archives
- Stephanie Turnbull, Library Assistant

RESEARCH

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- Heather Briggs, Post-doctoral Fellow and Fellow of the Arnold Arboretum
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Tree Spotters, the Arboretum's volunteer citizen scientists, observe *Tilia americana* (American linden) in the landscape.
Photo by Suzanne Mrozak



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Arnold Arboretum scientists and staff

Arnold Arboretum Visiting Scholars, Visiting Fellows, or Associates

✦ **Arnold Arboretum Award recipients**

☛ **Putnam Fellows**

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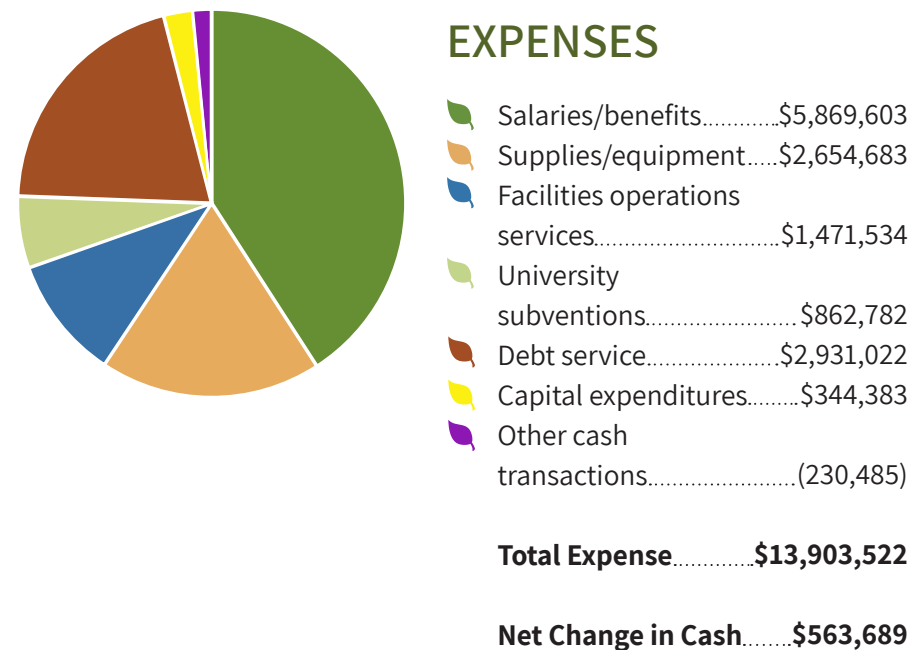
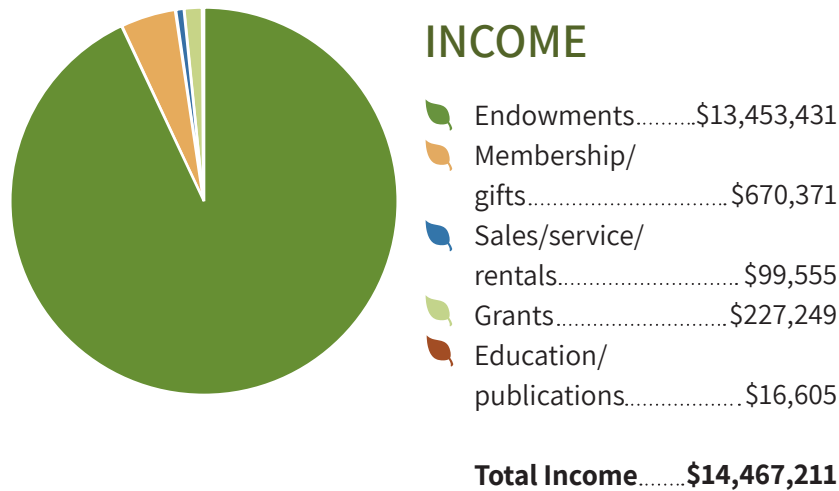
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FISCAL YEAR 2016: JULY 1, 2015–JUNE 30, 2016

Beyond funding for sponsored research, the Arnold Arboretum relies almost exclusively on the philanthropy of its friends and members, who have given generously to support the institution for the past 144 years. The information here reflects the financial activities of the Arboretum in the 2016 fiscal year (July 1, 2015–June 30, 2016).



NOTE 1: FY16 results are net of Case Estates sale and related expenses. The Case Estates property was sold on June 7, 2016 for \$13.4M. All proceeds were reinvested in the endowment, then partially distributed as follows (in millions):

Withdrawal from endowment	\$12.4
Additional debt payment	(6.5)
Reimbursement for current year Case Estates expenses	(3.4)
Partial reimbursement for prior year Case Estates expenses	(2.5)

NOTE 2: The Arboretum used its FY16 net change in cash to make additional payments on debt related to the Weld Hill Research and Administration Building (original loan \$35.7M). Given this debt load, as well as the prospect of diminishing endowment payout increases, the Arboretum has prioritized debt reduction in order to create sustainable budget increases for the future. As of June 30, 2016, the remaining balance was \$19.6M. By paying down additional debt, the Arboretum permanently reduces its annual payments, providing ongoing budget relief and funding critical Arboretum initiatives.



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