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Arboretum Annual Report 2016-2017

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Connecticut College

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Connecticut College
ARBORETUM ANNUAL REPORT
2016 – 2017

MISSION

The Connecticut College Arboretum is owned by Connecticut College and operated for the benefit of the College and the community. The Arboretum functions in support of the College's mission by helping to prepare people for a lifetime of learning about and interacting with the natural world. The mission of the Connecticut College Arboretum is:

TEACHING — To provide outdoor teaching, laboratory, and performance space for use by faculty and students in all college departments and programs. In both teaching and research, the Arboretum is a unique and valuable academic resource and support facility.

RESEARCH — To support and conduct research in a broad range of subjects, including ecology, field biology, geology, conservation, archeology, cultural and natural history, land management and others. Arboretum research emphasizes long-term studies.

CONSERVATION — To provide stewardship of College lands by protecting, sustaining and enhancing biological diversity of natural areas and other large tracts of open space. The Arboretum also provides leadership statewide and beyond in conservation matters.

COLLECTIONS — To maintain, develop and interpret well-documented plant collections for teaching, research, public and professional education and enjoyment.

STEWARDSHIP OF CULTURAL RESOURCES — To provide stewardship of cultural resources on College lands by protecting, studying, and interpreting archaeological and heritage sites.

PUBLIC EDUCATION — To provide programs and publications about conservation, horticulture, gardening, botany and natural history that enhance people's understanding of the natural world and foster an understanding of the Arboretum's mission.

RECREATION — To provide a place where people from the College and the community may enjoy passive recreation and where they may come to learn, reflect and renew themselves through contact with the natural world. The Arboretum enhances the quality of life both for the constituents of the College and the citizens of southeastern Connecticut.

Updated 2015

EVERY YEAR BRINGS NEW CHALLENGES AND NEW OPPORTUNITIES, and at Connecticut College, a new crop of students. First-year (aka Freshmen) seminars were created to combine orientation and advising with a seminar topic that depends on the professor's department and interests. On the orientation side, many seminar instructors have chosen to include Arboretum tours. This is a great way to introduce students to our amazing natural resources and programs in their first few weeks on campus. About 150 students participated this year, and the hope is they will continue to visit, explore and enjoy this unique asset during their four years on campus.

Some other highlights of this year, which are described in greater detail within, are:

- The creation of two interactive, online plant collection map applications that allow public access to collection information for the first time ever.
- Boardwalks were constructed through the Arboretum bog and at the edge of the Arboretum Pond to allow greater access to wetland habitats for teaching and research.
- State of the art landscape protection was used for the first time during planning and construction of a new campus connector road and associated sidewalks
- Policy statements were developed to address the major topics in the Arboretum Mission to provide historical context and guide future planning and programming.

One of the big plant collection challenges in the upcoming years will be dealing with arrival of the Emerald Ash Borer, an exotic invasive insect that will very likely kill any ash (*Fraxinus*) trees that are not treated with an insecticide. Beyond the collections, our New England roadsides and forests will once again go through the loss of a major species. Time will tell how this change compares with the loss of hemlock, American elm and chestnut all through introduced diseases and insects within the last 100 years.

I've personally been with the Arboretum long enough (35 years) to have seen major disturbances rock the planted and natural communities, from exotic species invasions to hurricanes, and I can only marvel at the resiliency of the natural world. For every seeming disaster there have always been saplings and seedlings just waiting for the next canopy gap to replace the dying hemlock or elm. Endless change in the landscape, and endless fascination for those who slow down enough to look around them.

Glenn D. Dreyer
Charles and Sarah P. Becker '27 Director



FIREWORKS (MILKWEED SEEDS) BY MARY ANN LEWIS

SUPPORTING TEACHING AND RESEARCH is a primary role of the Arboretum. Connecticut College recently completely revamped its general education requirements under the title “Connections,” and Arboretum staff worked over the past year to explore ways for the Arboretum to become more engaged in the new curriculum. One aspect of Connections is First-year Seminars, which combine a seminar topic with advising and orientation for students in their first semester. Seminars are offered by all the academic departments and have a wide diversity of subjects. As part of the new student orientation aspect nine different seminars took advantage of Arboretum guided tours. Led by Director Glenn Dreyer, Assistant Director Maggie Redfern and Jennifer Pagach of the Goodwin-Niering Center, these tours were a great way for many more students to become aware of the resources and possibilities in the Arboretum very early in their College careers. As the new curriculum is further developed, additional Arboretum experiences will be developed.

At the request of faculty in the biology and botany departments, boardwalks were con-

structed in the Arboretum pond and in the bog. The locations for the structures were selected based on faculty needs for their teaching and research programs. In the pond, the goal was to create access to both shallow and deep water habitats, while staying close to the shoreline so the interface between aquatic and terrestrial systems could be closely observed. In the bog, the walkway was designed to traverse the edge of the most open zone, with proximity to the nearby shrub hummocks and their associated plant species. Other goals were that they be essentially maintenance free, have minimal environmental impact and could stay in place year-round.

The introductory ecology course Bio 207 immediately utilized both boardwalks for a lab comparing water samples in the two distinct wetland ecosystems. In Bot 205: Plants, Protists and Fungi four field exercises, including ones examining fungal mycorrhizae, bryophytes, gymnosperms and flowering plants, served as focal points for the class. Protists (mostly unicellular organisms with complex cell structure) were routinely collected from the pond, bog and wetlands and used for laboratory-based study.

Support for over sixty percent of the board-

A NEW FLOATING BOARDWALK ON THE WEST SIDE OF THE ARBORETUM POND WAS INSTALLED JUST IN TIME FOR BIOLOGY AND BOTANY LABS IN FALL 2016.





ABOVE: PROFESSOR HARDEMAN'S INTRODUCTORY BOTANY LAB IN THE NATIVE PLANT COLLECTION.

walk construction costs came from special donations from the following foundations and individuals: Sun Hill Foundation; Community Foundation of Eastern Connecticut; Further Forward Foundation; Joanne Morton '76; Linda A. Fosseen '69; Urban Forestry Organization and Susan Rotch '65.

Anthropology and biology major Moriah McKenna '17 conducted archeological research with Professor Anthony Graesch on the Arboretum tract known as the Coffey Farm, which is located north of Gallows Lane between Old Norwich Road and Bolles Road. She was on site for a number of weeks in August 2016 and continued her work throughout the year, culminating in an honors thesis in anthropology titled *Anthropogenic Landscapes in Southern New England: An Archaeological Investigation of Farming Practices on an Eighteenth Century Colonial Farmstead in Southeastern Connecticut*. In this study, McKenna and Graesch applied the theory and method of landscape archaeology to the study of farming practices at an eighteenth century, 49-acre, colonial farmstead. They collected data with an array of methods — LiDAR, penetrometry, archaeological reconnaissance and aerial photography — that, when combined,

RIGHT: PROFESSOR GRAESCH CONSULTS WITH STUDENTS MORIAH MCKENNA '17 (STANDING) AND KATHERINE CHESTER '17 ABOUT LOCATING AN OLD CART PATH ON THE COFFEY FARM TRACT DURING HIS FIELD METHODS OF ARCHAEOLOGY IN THE ARBORETUM COURSE.



provided a fuller synthesis of the forms and focus of labor allocated at early farmsteads. A intensive walking survey, in particular, provided new data that was used to develop a typology of stone concentration features. They argued that the spatial analysis of stone concentration types in relation to other stone features may reveal variability in routine agricultural practices across farmstead fields. In May, Moriah led an

Arboretum sponsored, public walk through her study sites.

Biology major and music theory minor Jack Beltz '18 completed an independent study with Professor Askins on foraging behavior of waterfowl in the Mamacoke Conservation Area. He mapped the exact position of each bird using a GPS unit and a laser rangefinder, and recorded its behavior. This permitted him to create an activity budget for each species, and to analyze its main method of feeding (e.g., diving vs. upending). He used the same methods that were used by students in previous studies at this site. He also created some well-designed GIS maps, including one that shows the primary areas of activity for each species of waterfowl. This will be very helpful for conservation planning.

As noted in the Arboretum 2015-16 report, there were five students collaborating with faculty on research in the Arboretum last summer, including two studying vegetation with Professor Jones, two doing bird research with Professor Askins, and Moriah McKenna with Professor Graesch.

The Art 302 and Bot 215 courses once again collaborated last fall, with the Arboretum being the common focus. Teams composed of students from each class collaborated on projects to interpret some aspect of the Arboretum, through visual and audio techniques. Arboretum staff provided early input for the team's

concepts and attended the final project presentations in Buck Lodge.

Glenn Dreyer continued the tradition of offering incoming sophomores in the GNCE Certificate Program a history of environmental studies and land conservation at Connecticut College, featuring information about the development of the Arboretum and about the contributions of Richard Goodwin and William Niering. He also made a presentation about Arboretum land management philosophy and activities. Later in the semester, Assistant Director Maggie Redfern was invited to the GNCE



RIGHT: A FLOWERING
PITCHER PLANT
(*SARRACENIA PURPUREA*)
VISIBLE FROM THE NEW
BOG BOARDWALK.

BELOW: DIRECTOR DREYER
DISCUSSING PLANT ID WITH
SYSTEMATIC BOTANY CLASS
STUDENTS ON A FIELD
TRIP TO THE MEADOWS ON
BENHAM AVENUE.





BACK FROM MAMACOKE
(AFTER A FIRST YEAR
SEMINAR CLASS VISIT) BY
A.T. THOMAS '20

seminar to speak about ecological landscaping, habitat conservation and the importance of native plants for pollinators.

Maggie Redfern served as a critic for Rebeka Sturges' Landscape Architecture: Design Studio Arc 261 student presentations of design proposals to improve campus landscape and infrastructure at mid-semester and final reviews.

Maggie Redfern also contributed to Martha Gossel's, Molecular Cell Biology Bio 309 in which a course goal was to use DNA analysis to identify cultivars of dogwood trees at the Wakefield Estate in Milton, Massachusetts. Maggie was invited to help because she had previously studied the plant collections at the Wakefield Estate. She attended introductory class about the property and the problem of identifying plant cultivars; went on field trip to Wakefield Estate to collect plant material and led a tour of the landscape; participated in lab class to extract genomic DNA from *Benthamidia japonica* 'Greensleeves' leaf buds, and attended final student presentations on the results of their analysis.

The Arboretum grounds staff is also in charge of managing the College greenhouse. A large portion of one of the four glass rooms was devoted to Professor Spicer's aspen tree research specimens. Soil benches in the center room was devoted to individual student gardens for the introductory botany course in the fall and for students in Plants, Protists and Fungi during the spring. The potted collection of plants represents the diversity

of mainly tropical plants from around the world, and these are regularly used in numerous courses.

Courses known to have used the Arboretum 2016-17

Ant 406 Field Methods in Archeology of Arboretum

Arc 261 Landscape Architecture Design Studio

Art 302 Designing Visual Information

Bio 118 Understanding Evolution

Bio 204 Ornithology

Bio 207 Ecology

Bio 224 Animal Behavior

Bot 115 Introduction to Botany

Bot 117 Introduction to Ethnobotany

Bot 205 Plants Protists and Fungi

Bot 215 Systematic Botany and the Local Flora

Bot 299 Botanical Latin 115

Bot 311 Ethnobotany of Southern New England

ES 115 Physical Geology

ES 312 Vector-based GIS

FYS 106A Toxins in the Nervous System

FYS 106D Earth Justice and Indigeneity

FYS 106F Afrofuturism in Black Film/Art

FYS 106H The World We Live In

FYS 106L Cultural Meanings, Identity and

Human Development

FYS 106U Voting: Theory and Practice

FYS 106V Modern Jewish Writers

FYS 106W War and Peace

FYS 116A Performing Citizenship

● EDUCATION & OUTREACH

IN HER SECOND FULL YEAR as Arboretum Assistant Director for Public Programs and Volunteers, Maggie Redfern has greatly enriched educational offerings and successfully attracted participants for all programs. Over 1,000 individual participated in Arboretum public programs, which included 19 workshops, two conferences, 13 guided walks and three family programs. Many programs were led by students, graduates, faculty and staff. This year there was an increase in participation by Connecticut College students, a goal set last year.

In 2016 the New England Wildflower Society (NEWFS) cosponsored the annual Smaller American Lawns Today (SALT) Seminar, which drew the largest audience ever with 127 participants. Several popular speakers from past conferences were brought back to provide information on why and how we should grow native plants. The keynote presentation, *The Future of Native Plants in the Built Landscape* was delivered by Larry Weaner, Principal of Larry Weaner Landscape Associates and founder of New Directions in the American Landscape (NDAL) an educational organization. Other presentations were: *Designing Plant Communities* by

Claudia West, Author and Ecological Sales Manager at North Creek Nurseries; *Low-maintenance Plants for the Deconstructed Landscape* by Dan Jaffe, Propagator and Stock Bed Grower at New England Wildflower Society; and *The Evolving American Lawn* by Judy Preston, Long Island Sound Outreach Coordinator for Connecticut SeaGrant. The Executive Director of NEWFS presented the organization's first ever Regional Impact Award to NDAL for twenty seven years of continuous educational programming on the subject of ecological landscaping.

The annual two day NDAL/Arboretum cosponsored ecological landscaping symposium in January continued to grow, with 165 design professionals from all over New England attending in 2017. The 12 speakers presented on the theme "Analyzing the Wild, Designing the Garden."

The Arboretum presented four screenings of the new documentary "Hometown Habitat: Stories of Bringing Nature Home." The movie is based on University of Delaware Professor Douglas Tallamy's ground breaking work on the ecological benefits of landscaping with native species. The Arboretum made a financial contribution to the making of the film, which allowed us to share it with audiences at Connecticut College, the Public Library of New London, the Mystic and Noank Public Library, and Cragin Memorial Library in Colchester. Following the viewings, the audiences engaged in lively discussions about the role of native plants and how to spread the message to the larger community. Approximately 150 people saw the film at these screenings.

Due to popular demand from our early summer concert, the Arboretum presented another Music in the Meadow event in September featuring Dirt Road Radio, Wise Old Moon, and Vince Thompson & Next Fun Thing. The sixth concert in this series was presented in June 2017 with another line-up of roots rock/Americana music including The Riverdogs, Black Marmot and Wild Sun.

The Arboretum hosted several workshops connecting people to plants. In *The Art and Science of Preserving Plant Specimens*, participants learned the history of herbarium collections and how to press woody plants, ferns and seaweeds. *Painting the Landscape*



A GROUP OF YOUNG TREE HUGGERS MEASURE A PIN OAK IN THE "IF I WERE AN OAK TREE" PROGRAM, NOV. 2016.



ABOVE: DIRECTOR OF THE UNIVERSITY OF NORTH CAROLINA-CHAPEL HILL HERBARIUM ALAN WEAKLEY SPEAKS ABOUT "THE ECOSYSTEMS AND FLORA OF EASTERN NORTH AMERICA" AT THE ECOLOGICAL LANDSCAPE SYMPOSIUM, JAN. 2017



LEFT: ASSISTANT DIRECTOR REDFERN PRESENTING AVA DIAZ-SAAVEDRA WITH AN AWARD FOR HER LANDSCAPE PHOTOGRAPH, APRIL 2017.

TOURS

While the Saturday morning free guided tours offered in the fall of the Native Plant Collection, Caroline Black Garden and Campus Landscape didn't draw as many people hoped for, the wide variety of other free themed tours drew large audiences.

Two walks led by Maggie Redfern in New London reached many new people who had never attended Arboretum programs before. About 40 people visited Cedar Grove Cemetery on a beautiful fall day and upwards of 80 people attended the downtown walk thanks in large part to an article publicizing the walk in the local newspaper.

Full Moon Walks in September and April drew about 50 people each.

Environmental Studies Senior Lecturer Beverly Chomiak led two intrepid groups on rugged walks around Mamacoke Island, during which she interpreted millions of years of geologic history.

Jack Beltz '18 led an early morning *Fall Bird Walk* in the Native Plant Collection. Jack had participated in bird research with Professor Askins the previous summer, including the biennial breeding bird census in the Bolleswood Natural Area.

At the very end of spring semester Moriah McKenna '17 shared the archaeological research she conducted in the Arboretum with a tour of the stone concentrations on the Coffey Farm tract.

was popular again in the fall and a new art class *Nature Printmaking* was offered in the spring. A *Grapevine Craft Workshop* helped to clear the Arboretum trees of climbing vines and provided the students material for making unique wreaths and baskets. Other perennially popular classes were offered again include: *Collecting Seeds for Propagation*, *Native Oak ID*, *Holiday Wreath Making*, *Tap into Maple Syrup Production*, *The Art and Science of Pruning*, *Growing Plants from Seed*, *Orchids for Beginners*, and *Basket Making*.

ABOVE: **ARBORETUM VOLUNTEER LYDIA PAN (CENTER) LED A TOUR OF THE COLLEGE GREENHOUSE DURING THE WORKSHOP ON GROWING ORCHIDS, APRIL 2017.**



RIGHT: **FLORENCE GRISWOLD MUSEUM ART EDUCATOR JULIE RIGGS (RIGHT) REVEALS A NATURE PRINT MADE BY SHARON VAN METER '20 IN BUCK LODGE, APRIL 2017.**

ARBO PROJECT

Botany major and English minor Isabelle Smith '19 took over as ArboProject program coordinator at the end of the 2015-16 academic year. She and another student, Josh Lee '18, worked on the Arboretum grounds over the summer and thus were available to lead tours for 46 students with the assistance of two Arboretum volunteer docents, Lydia Pan and Pam Wright. Fall tours were given to approximately 247 students from Clark Lane Middle School, St. Regis School, Waterford High School, Franklin Academy, St. Thomas Moore School and a Cub Scouts pack. Spring tours highlighted flowers and pollinators for approximately 273 students from Nathan Hale School, Bennie Dover Jackson School, Connecticut College Children's Center and Clark Lane Middle School.

GROUP TOURS

The following organizations scheduled Arboretum tours during 2016-17: Stone Ridge Senior Living community; Amherst Early Music Festival; Connecticut Land Conservation Council; Haddam Senior Center; Beckish Senior Center, Columbia; East Haddam Garden Club; Thames River Innovation Place; Mystic Seaport Volunteers and Trillium Garden Club, Groton. Total attendance was about 120 people. The Arboretum also provides guided tours annually for the Admissions Department open houses during spring and fall and for alumni during reunion.



COLLABORATIONS WITH OTHER ORGANIZATIONS

During February, the Connecticut Tree Protective Association, which represents and educates licensed Connecticut Arborists, used Olin Auditorium and the campus grounds for a Winter Tree Identification workshop. Mary Villa assisted in the outdoor portion of the program.

The Connecticut Master Gardener Association held its 2017 Annual Symposium in the College Center at Crozier-Williams. Over 350 people attended this event, which was organized by Arboretum volunteer (and Master Gardener Association President) Tracy Burrell and a committee of ten master gardeners.

During summer 2016, Flock Theatre presented Shakespeare in the Arboretum. The year's productions were Edward III and Taming of the Shrew. The Arboretum provides the Outdoor Theater and use of Buck Lodge to the community theater group free of charge.

Wild Ones is a national native plant garden-

ing organization with a Connecticut Chapter sponsored by the Arboretum. Local Wild Ones meet monthly in New London Hall. The three most popular programs this year each drew about 50 plus people, one of which was Arboretum curator Mary Villa's Winter Tree ID workshop and walking tour.

Use of Buck Lodge by College groups has increased in recent years. This year the lodge welcomed: Women's and Men's Soccer Soccer, Outdoors Club, Theater major Lana Richards '17 performance of *Grapes of Wrath*, German Department, Office of Sustainability, Toor Cummings Center for International Studies & the Liberal Arts, Physics Department, Slavic Studies, Alumni Association, Dean of Students, Student Government Association, Botany Department (potluck and classes), and several Arboretum classes and workshops.

ANNUAL PHOTO CONTEST

The annual photo contest is a very popular event and provides another reason for all kinds of people to appreciate the Arboretum's natural beauty. Some changes were made this year to both the prize categories and the display location. Prizes were awarded to one adult and one youth for each of the following categories:

WILDLIFE

Frog Eggs by Charlotte Steffian (Youth)
Bird by Hannah Megathilin '20 (Adult)

FLORA

Beauty of Shadow by Estlin Davies-Smith (Youth)
Fireworks by Mary Ann Lewis (Adult)

LANDSCAPE

The Path You Walk by Ava Diaz-Saavedra (Youth)
(Mamacoke) puddle reflection by Denise Davies (Adult)

TREE

Up a tree without a paddle by Weston Court-right (Youth)
Winter Reflection by Laura Stoebel (Adult)

Sixty-four entries were on display at Unity House from April 28 through May 24. The deadline for entries was moved up six weeks to encourage participation from the College community. The awards reception was held on Arbor Day. The Linda Lear Center for Special Collections and Archives set up a temporary exhibit of historic photographs, maps and documents of the Arboretum for the reception. They also made buttons featuring historic images and contest entries of trees for everyone who came. Thanks go to the volunteer judges: Richard Madonna, vice president for finance and administration, Leigh Knuttle, Arboretum horticulturalist, and Koleyatu Sheriff '18, psychology major and art minor.



ASSISTANT DIRECTOR REDFERN LEADS A GROUP TO THE STATE CHAMPION WEEPING EUROPEAN BEECH TREE ON THE NEW LONDON TREE WALK, MAY 2017.

● PLANT COLLECTION

THE ARBORETUM CURATES three outdoor living plant collections in addition to the greenhouse collection of primarily tropical plants. Arboretum maintenance responsibilities are for the Native Plant Collection and the Caroline Black Garden, with the Office of Facilities Management maintaining the main campus, athletic facilities and campus housing. The Arboretum also manages approximately 600 acres of natural and semi natural conservation land surrounding the developed portions of campus. Mary Villa is responsible for curation, including record keeping, mapping and labeling of outdoor plant collections. Horticulturist Leigh Knuttel, with our two groundspeople Bryan Goulet and Kraig Clark, are the entire maintenance staff.

protection measures. The College engaged a landscape architect and consulting arborist to participate in the planning and design stages of the project, and the arborist provided advice on site during the construction phase. Of primary concern was the very large red oak tree locat-

RIGHT: **CAMPUS LANDSCAPE PROTECTION DURING CONSTRUCTION OF ROADS AND SIDEWALKS INCLUDED TRENCHING FOR ELECTRICAL CONDUIT USING A SUPERSONIC AIR TOOL WHICH REMOVES SOIL WITHOUT DAMAGING ROOTS.**

BELOW: **CAMPUS LANDSCAPE PROTECTION DURING CONSTRUCTION ALSO INCLUDED USING INNOVATIVE SIDEWALK BUILDING TECHNIQUES THAT WENT OVER EXISTING TREE ROOTS RATHER THAN CUTTING ROOTS AND COMPACTING SOIL.**

CAMPUS

While the Arboretum has had no role in campus landscape maintenance, Director Dreyer has become very engaged in working with the Facilities Office in limiting damage to existing landscape features during construction projects. The summer of 2016 connector road and sidewalk construction project provided an ideal opportunity to apply state-of-the-art tree





ARBORETUM STAFF AND STUDENT WORKERS PLANTED 5 BLACK TUPELO TREES IN THE GRASSY ISLAND WEST OF THE CAMPUS SOUTH PARKING LOT.

ed between Unity and Becker Houses around which new sidewalks were built. It is hoped that the planning procedures and construction techniques learned during this project will be institutionalized and utilized in the future.

New landscaping for those summer construction projects was limited to the areas on the north and west sides of Unity House. A landscape design was commissioned and received for the roadway and Becker House area, where many mature trees had to be removed for the road building to proceed. Implementation was delayed to wait for results of 2017-18 Campus Master Plan process.

In spring 2017 the Arboretum planted five black tupelo (*Nyssa sylvatica*) trees west of south parking lot, among a series of four David Smalley sculptures.

Grounds Supervisor James Luce designed and installed landscaping around Hillel House that favored native species.

Multiple tall evergreen trees were removed from the slope between the east end of the pedestrian bridge and the Athletic Center in order to reclaim the view to the Athletic Center and

the Thames River.

The Arboretum contracted with a consulting arborist to perform a financial appraisal of the 1,200 plus trees in the Campus Landscape Collection. Based on the Arboretum's most recent inventory that listed species, size and condition, the total appraised value of the campus trees is \$17,544,674. The hope is that increasing awareness that the College's "green infrastructure" has actual financial value will help the argument for augmenting maintenance resources for campus tree care.

NATIVE PLANT COLLECTION

During summer 2016, Curator Mary Villa completed the two-year Native Plant Collection Inventory process. She was assisted by summer intern and botany major Georgia Hahn '17. As part of that process they engraved 415 new accession tags for trees and shrubs.

Over the past year Mary Villa spent significant time observing shrubs in the Nancy Moss Fine Native Azalea Garden. This is a collection of almost all of the species of the genus

ABOVE: THE NANCY MOSS FINE NATIVE AZALEA GARDEN WAS THE SUBJECT OF INTENSIVE EFFORTS TO VERIFY SPECIES IDENTIFICATION AND OPEN UP MORE SPACE BY TRANSPLANTING AND EXPANDING THE AREA OF THE COLLECTION.

BELOW: THE RECENTLY RENOVATED WATER FEATURE AREA OF THE CAROLINE BLACK GARDEN USES MOSS AS THE MAIN GROUND COVER AS ONE WAY TO EVOKE THE CHARACTER OF AN ASIAN GARDEN.



Rhododendron native to eastern North America. Established in the late 1970s by Botany Professor Emerita Sally Taylor, and located just north of the main entrance, the collection had become overgrown and some plants were not correctly identified. Mary made time to visit the collection periodically to observe each shrub in bloom, which is necessary for positive identification. At the same time, staff consulted on a plan to transplant shrubs out of overgrown areas to spread the collection out more and allow shrubs to be seen more as individuals. Most of the desired transplanting was accomplished during fall 2016 and spring 2017. Native ground covers, particularly creeping phlox (*Phlox stolonifera*), were planted into areas opened between shrubs. Currently the collection contains 18 species of *Rhododendron* and two natural hybrids or varieties.

Boardwalks were constructed across the southern portion of the bog and along the northwestern edge of the pond. The bog boardwalk surface was an FWM dock system composed of perforated plastic panels in aluminum frames. These were supported by aluminum poles and pads. The construction occurred during a drought in late summer which made installation very easy. The pond floating boardwalk was an EZ Dock modular floating surface held in place by steel poles driven into the bottom.



CAROLINE BLACK GARDEN

Beginning with the summer 2017 inventory of plant specimens in the Caroline Black Garden, tree heights will be measured and added to the plant records database for the first time. In previous inventories only tree diameter was measured, with shrubs records including both height and spread. Isabelle Smith '19 was hired as summer curatorial intern.

The Parthenia Greer Johnson Holly Collection was planted along southern border of the Garden in 1997. The collection had become a bit tight and overgrown and staff worked during summer 2017 to prune, transplant and remove some specimens to rejuvenate the planting.

Plans to replace the six foot high plastic deer fencing surrounding the garden with a ten foot high black chain link fence on all but the western (Mohegan Avenue/Route 32) side were put on hold by a vote of the College's Facilities and Land Management Committee to await results from the Campus Master Plan.

PEST MANAGEMENT

Emerald Ash Borer (EAB), an invasive exotic insect which has killed millions of ash trees in the Midwest, was first identified in Connecticut five years ago. By last year it had reached the local towns of East Lyme and Salem. In consultation with scientists from the Connecticut Agricultural Experiment Station, the Arboretum began to utilize an integrated pest management strategy to deal with the inevitable infestation. During fall 2016 we identified all ash trees in the Arboretum plant collections (almost all were *Fraxinus americanus*, white ash). For trees in the Native Plant Collection, Glenn Dreyer and Mary Villa visually evaluated 65 trees to determine their condition and judge the amount of hazard they would pose should they die and fall. The trees were placed in one of three categories: 1. Treat –those deemed to be healthy in appropriate locations to be kept alive as part of the plant collection; 2. Remove –those trees not worthy of saving, and located in close proximity to trails or structures; 3. Ignore – those not worthy of saving, and would not pose a threat if they died in place.

In February 2017, as part of annual contract pruning and removals, arborists removed 10 mature ash trees from the Native Plant Collection, many located in the Wildflower Garden.



A SPECIMEN OF MAGNOLIA "JANE" WAS PLANTED AS A MEMORIAL TO THE LATE ANIQUE ASHRAF '17.



BELOW: CURATOR MARY VILLA (IN RED JACKET) LEADING AN OAK IDENTIFICATION WORKSHOP IN THE NATIVE PLANT COLLECTION.

More trees will be removed as part of the next contract. The trees to be saved were treated with a lower trunk bark spray of an insecticide in mid-June. This systemic insecticide has a short residual, so it needs to be applied every year. Although male ash trees are only a minor pollen source for bees, treatments applied after flowering, and the short half-life of the chemical, assures that pollen will not contain the insecticide. Staff will stay informed about any effective, less toxic approaches to control EAB.

Curator Villa helped Grounds Supervisor Jim Luce locate the over 160 ash trees on campus. Arboretum staff made suggestions on which trees in the Campus Landscape Collection should be saved by treating them and also provided Jim Luce with documents and recommendations about managing EAB on campus.

Gypsy moth caterpillar populations are very high in the region during 2017 for the first time



THE NIEDERMAN
MEMORIAL NATIVE
MEADOW GARDEN JUST
SOUTH OF CROSIER-
WILLIAMS WAS
SPECTACULAR LAST FALL.

since the mid-1980s. This is likely due to the past two summers of severe drought which inhibited the fungus that keeps the gypsy moth population in check. Damage was relatively light and not widespread on College property, and it seems likely that the more normal rainfall pattern this year will allow the fungus to kill most caterpillars before they become egg-laying moths.

Native viburnums, particularly *V. dentatum* and *V. rafinesquianum* have been subject to severe damage by the introduced, exotic Viburnum Leaf Beetles for the past four years. By spring 2017 a number of shrubs appear to have been killed outright by repeated defoliation.

ADDITIONS TO THE PLANT COLLECTIONS June 2016 through May 2017

*New taxa in collection; (number of plants)

CAMPUS LANDSCAPE COLLECTION

- **Albizia julibrissin* 'Summer Chocolate' (1)
summer chocolate silk-tree
- Buxus sinica* var. *insularis* 'Green Velvet' (5)

- green velvet Korean boxwood
- **Caryopteris x clandonensis* 'Dark Knight' (5)
dark knight bluebeard
- Clethra alnifolia* 'Hummingbird' (48)
hummingbird summersweet clethra
- **Fraxinus pennsylvanica* (1) green ash
- Hamamelis vernalis* (5) vernal witchhazel
- **Hydrangea macrophylla* (Cityline Group) [Rio]
= 'Ragra' (3) Rio bigleaf hydrangea
- **Hydrangea quercifolia* 'Alice' (1) Alice oakleaf
hydrangea
- Ilex glabra* 'Densa' (12) dense inkberry
- **Itea virginica* [Little Henry] = 'Sprich' (93)
little Henry Virginia sweetspire
- **Juniperus chinensis* 'Blue Point' (4) teardrop
juniper
- Magnolia* 'Jane' (1) Jane hybrid magnolia.
Memorial for Anique Ashfar '17
- Nyssa sylvatica* (5) black tupelo.
- Prunus* 'Okame' (1) okame cherry
- **Rosa* 'The Fairy' (23) the fairy rose

NATIVE PLANT COLLECTION

- Arctostaphylos uva-ursi* (42) bearberry
- **Chamaecyparis thyoides* 'Yankee Blue' (1)



BOTANIST RECENTLY NAMED A NEW SPECIES OF NATIVE PRICKLY PEAR CACTUS, WHICH WAS ALREADY IN OUR COLLECTION. *OPUNTIA CESPITOSA* WITH ORANGE IN FLOWER CENTERS WAS PREVIOUSLY CONSIDERED PART OF *OPUNTIA HUMIFUSA*, WITH ALL YELLOW FLOWERS.

- Yankee blue Atlantic whitecedar
- Hydrangea arborescens* (2) smooth hydrangea
- **Kalmia latifolia* 'Forever Red' (1) forever red mountain laurel
- **Larix laricina* (3) American larch
- Magnolia virginiana* (2) sweetbay magnolia
- **Opuntia humifusa* var. *humifusa* (1) eastern pricklypear
- Pinus rigida* (2) pitch pine
- Rhododendron atlanticum* (1) coast azalea
- **Rhododendron occidentale* (1) western azalea
- Ulmus americana* 'Princeton' (1) Princeton American elm. Memorial for Stanley Wertheimer, Professor Emeritus of Mathematics.
- Vaccinium angustifolium* (5) lowbush blueberry

ACCESSIONS BY COLLECTIONS

As of June 1, 2017, there were 6,469 accessioned living plants representing 818 taxa as 2,542 trees, 3,882 shrubs, and 45 vines. These living plants are broken down further as follows:

COLLECTION	TREES	TAXA	SHRUBS	TAXA	VINES	TAXA	TOTAL PLANTS	TOTAL TAXA
NATIVE PLANT	1,069	148	1,332	203	34	12	2,435	363
CAMPUS LANDSCAPE	1,307	240	2,152	223	7	2	3,466	465
CAROLINE BLACK GARDEN	166	75	398	144	4	2	568	221
TOTALS:	2,542		3,882		45		6,469	818

● MEDIA, COMMUNICATIONS & PLANNING

DIGITAL ARBORETUM MAPS

OVER A PERIOD OF ABOUT FIVE YEARS

Curator Mary Villa and student assistants completed the conversion of hand drawn plant collection maps that show the location of all 6,000 plus trees, shrubs and vines to digital maps using ArcGIS. This could not have been accomplished without the dedicated support of Environmental Studies Senior Lecturer Beverly Chomiak, who is an unparalleled resource for this department. During summer 2017 the Arboretum hired Beverly on a part time basis to help us get a number of specialized maps updated and/or created. One particularly welcome outcome was the overall map of College Arboretum property showing all stonewalls, trails, wetlands, water features, roads and buildings. Among other uses, this map appears in the updated Map & Guide to the Arboretum that was redesigned and printed in fall 2016. This and other maps are available on the Arboretum website: <http://www.conncoll.edu/the-arboretum/visiting-the-arboretum/maps/>

During fall 2016 Glenn Dreyer noticed an online map of the UMass Amherst campus

arboretum, and realized it was in ArcGIS format. He contacted the author and researched the tools available to convert ArcGIS desktop maps to interactive maps that can be shared on the internet. Mary Villa and Beverly Chomiak learned how to use these tools to create online, searchable digital maps of the Campus Tree Collection and the Native Tree and Shrub Collection. These are also available on the website maps page.

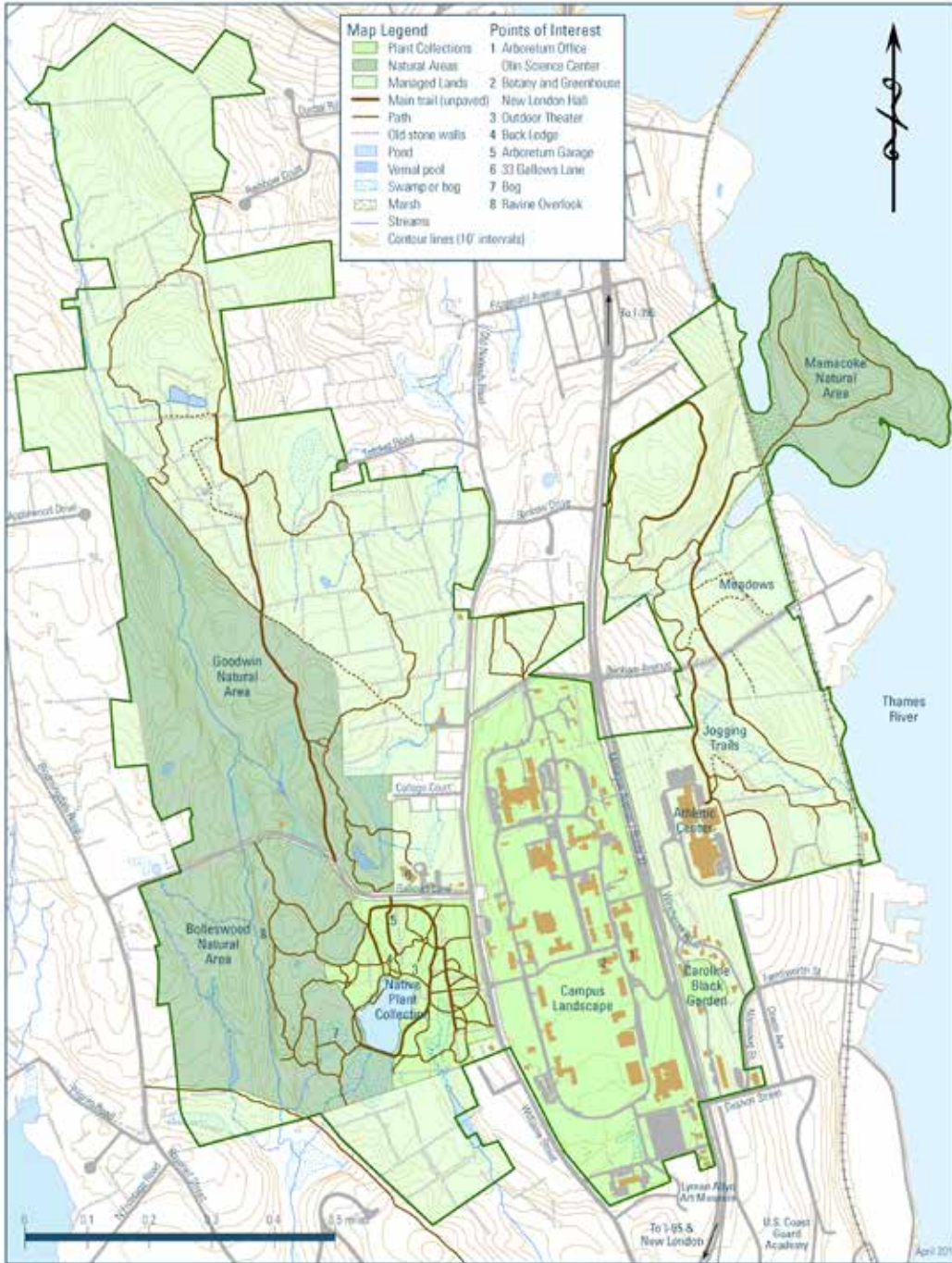
This is a watershed event for the Arboretum, because for the first time information about the individual plants in the collections can be accessed by anyone at any time. Up until this point, collection information was only available via a dedicated in-house database. Currently the public map-based information includes location, common and scientific name and most recent measurement. Other data can be included in the future, including images.

Beverly Chomiak has also developed a Mamacoke Geology Walk Map, which she then converted to a “story map” that has allowed her to narrate and illustrate the geologic history of Mamacoke Island and its surroundings. These maps will be available online later in the year.

SCREEN SHOT OF THE NEW, INTERACTIVE CAMPUS TREES MAP APPLICATION.



Connecticut College Arboretum



THE NEW ARBORETUM MAP

SOCIAL MEDIA

The Arboretum Facebook page reached 1,000 followers on March 31, 2017; and 1,085 as of June 1. This has increasingly become the most effective means of communicating about public programs. We had 732 Twitter followers as of June 1, 2017 and a total of 484 Instagram followers by that date.

The Arboretum has been utilizing Flickr to

share archival and current images with the public. As of June 1, 2017 there were 1,248 pictures posted. Links to all Arboretum social media locations may be found at the bottom of each page on our website.

During the Wikipedia edit-a-thon: hosted by Shain Library on International Women's Day, staff added new entry for the late botany professor Caroline Black.

WEBSITE

During the course of this year considerable time was devoted to reorganizing and refreshing all aspects of the Arboretum website. The menu structure was simplified and reorganized. New images were added and more appropriate ones were swapped with those less so. A new section on ecological landscaping was added.

PUBLICATIONS

The general information brochure, now called Map & Guide was redesigned and reprinted in a style similar to last year's updates of the Self-Guided Tour and the Ethnobotany of native trees brochures. For the first time, the map in this brochure shows the entire College Arboretum Property based on our extensive GIS files. All boundaries, trails, topography, College buildings, surrounding roads and stone walls are shown with a high level of accuracy. A recalculation of all college property found that 750 acres was an accurate number. Thanks go to Beverly Chomiak and her GIS students over the years for developing the map information.

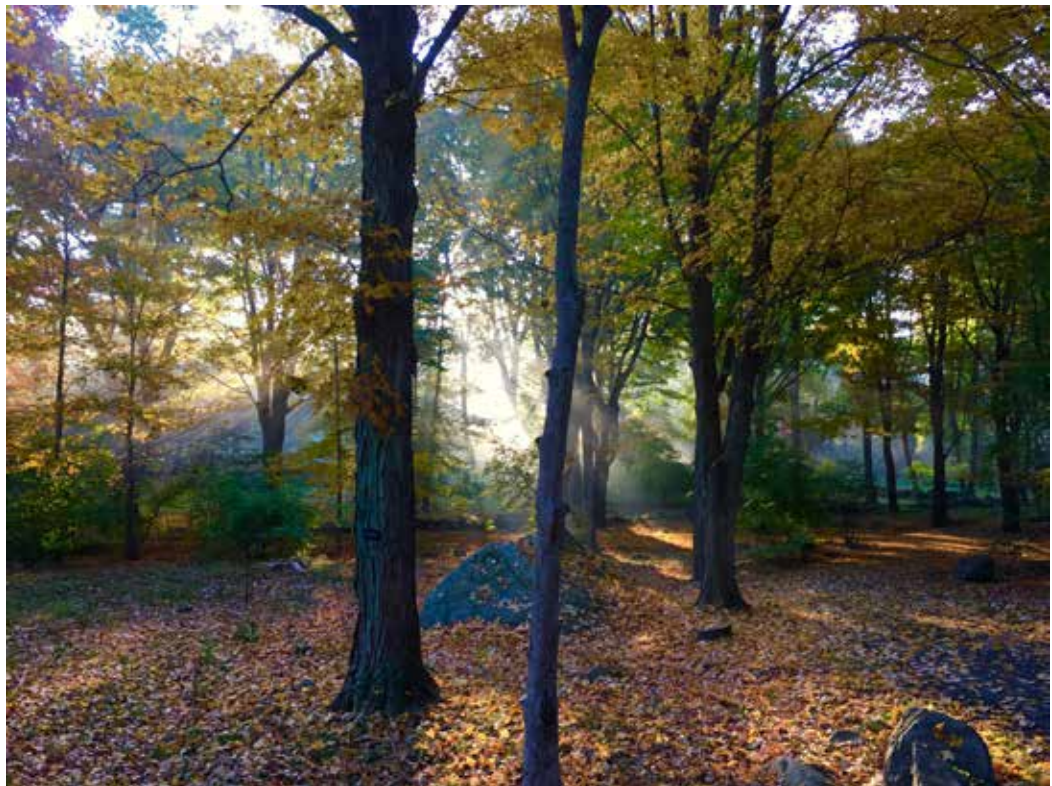
The text and map for an update of the Trees of Campus brochure has been completed, and publication is anticipated for fall 2017.

Work has begun on an Arboretum bulletin about Caroline Black and the history of the garden named in her honor. Professor Askins completed a draft manuscript for a new version of the Birds of the Arboretum bulletin during summer 2017.

POLICIES AND PLANNING

During 2016 Glenn Dreyer drafted policy statements related to each of the seven major topics of the Arboretum Mission Statement. These are teaching, research, conservation, collections, stewardship of cultural resources, public education and recreation. The drafts were circulated for comments and input by Arboretum staff and those faculty members who regularly utilized the Arboretum. Anthropology professor Graesch was particularly helpful in developing the policies for stewardship of cultural resources. The finalized policies provide history, context and management guidance for Arboretum staff as well as those who use the Arboretum. The policies contain goals for each topic area, and thus they are also a first step in developing a long term plan for the Arboretum. The policies, along with the new general map of the College Arboretum property, was presented to the Facilities and Land Management Committee in late January 2017.

OCTOBER MORNING BY
ALEXANDRA WACTOR '18





ARBORETUM STAFF DURING SUMMER 2017 (L-R): CHRISTINE DONOVAN, ISABELLE SMITH '19, KRAIG CLARK, BRYAN GOULET, MARY VILLA, STERLING ROWE '19, MAGGIE REDFERN, CAROLINE LONGACRE '19, LEIGH KNUTTTEL, EMILIO PALLARES '19, GLENN DREYER MA '83.

STAFF

THE ARBORETUM STAFF has remained constant for the past three years. Staff members include: Glenn Dreyer, Charles & Sarah P. Becker '27 Director; Maggie Redfern, Assistant Director; Mary Villa, Curator and Information Manager; Leigh Knuttel, Horticulturist; Bryan Goulet, Senior Groundsperson; Kraig Clark, Groundsperson; Christine Donovan, Department Assistant (part time).

During Fall 2016 Arboretum Staff and two individuals from the Facilities Grounds staff participated in a half-day workshop on the subject of evaluating the condition of trees in terms of health and structural integrity, and how risk is determined. The workshop was led by a Consulting Arborist Allan Fenner.

Other conferences and workshops attended by Arboretum staff, other than those this department originated, were: a workshop on “What Role Do ‘Nativars’ Play in an Ecological Landscape?” sponsored by the Ecological Landscape Alliance at the New England Wild Flower Society in July 2016; Connecticut Invasive Plant Working Group (CIPWG) 2016 Invasive Plant Symposium in October; “Artful Stormwater Solutions: Eco-tour at Roger Williams Park” in June 2017.

THE ARBORETUM IS GRATEFUL FOR THE GENEROUS SUPPORT PROVIDED THROUGH THE FOLLOWING ENDOWED FUNDS:

Charles and Sarah P. Becker '27 Arboretum Directorship Fund
 A. Clayton Scribner Arboretum Library Fund
 Ann C. Wheeler '34 Endowed Arboretum Fund
 Arboretum Development Fund
 Arboretum Director's Discretionary Fund
 Arboretum Edgerton Memorial Fund
 Arboretum Plant Fund
 Betty Walther Memorial Arboretum Fund
 Bolleswood Natural Area Fund
 Class of 1944 Special Projects Fund
 Daniel Klagsbrun '86 Memorial Garden Endowment Fund
 Doris Edgerton Abel Memorial Edgerton Wildflower Garden Fund
 Endowed Unrestricted Arboretum Fund
 Gertrude Brown Memorial Fund
 Lillian Dauby Gries '27 Conifer Maintenance Fund
 Lillian Niederman Memorial Garden Fund
 Mamacoke Island Endowed Fund
 Marjorie Holloway Endowed Memorial Garden
 Mr. and Mrs. Nelson L. Buck Arboretum Fund
 Parthenia Grier Johnson Holly Collection Garden Fund
 Sally and Roy Taylor Arboretum Endowed Fund
 Sylvia Blake Harrison Memorial Garden Maintenance Fund

**CONSULTING ARBORIST
ALLAN FENNER (CENTER)
LED A TREE CONDITION
AND RISK ASSESSMENT
WORKSHOP ON CAMPUS
FOR ARBORETUM AND
GROUNDS STAFF.**



STUDENTS

During each semester the Arboretum hires 12-16 students to assist in grounds and greenhouse maintenance operations. Another one or two students are hired to assist in the office. During summer three people, usually Conn students, work full time for up to 12 weeks assisting in maintenance activities. Also each summer a student is selected as a Curatorial Intern to assist Mary Villa in plant collection inventories. Visitors often marvel at the Arboretum's ability to manage over 630 acres with only three full time staff. Student workers are a big part of the secret.

ARBO STUDENT WORKERS

SUMMER 2016

Isabelle Smith '19 Kevin Irakoze '16
Josh Lee '18

FALL 2016

Brion Morrissey- Bickerton '17	Hanna Bobrowicz '20
Christopher Burnham '17	Harris Krizmanich '17
Connor Grove '17	Joshua Hausman '18
Dana Bergenfeld '17	Marshall Cooper '20
Dominic Lentini '18	Oliver Holmes '20
Eamon Horrigan '19	Samuel Lichtenstein '17
Emilio Pallares '19	Sarah Bass '19
Gabriel Ryan '17	Thayer Taft '20

SPRING 2017

Aidan Clark-Long '19	Gabriel Arnold '17
Ben Ynocencio '19	Harris Krizmanich '17
Blake O'Neal '19	James Losito '17
Christopher Burnham '17	Joshua Hausman '18
Connor Grove '17	Marshall Cooper '20
Dana Bergenfeld '17	Oliver Holmes '20
Eamon Horrigan '19	Sarah Bass '19
Emilio Pallares '19	Samuel Lichtenstein '17
	William Platt '19

SUMMER 2017

Caroline Longacre '19	Sterling Rowe '19
Emilio Pallares '19	

VOLUNTEERS

The Arboretum maintains an active volunteer program, which includes College students and members of the local community. Much like the student workers, our volunteers allow the Arboretum to accomplish so much more than would otherwise be possible. It is with deep gratitude and pride that we list their names here.

ARBORETUM VOLUNTEERS

Tour Docents

Allen Gauthier
Joan Flynn

Kathryn Williams
Linda Boodman
Lydia Pan
Mike Wuenscher
Pam Wright
Sean Kane '87

Susan Munger
Tracy Burrell
Trish Helm

Program Instructors

Beverly Chomiak
Caroline Driscoll '84
Jacinta Meyers
Jack Beltz '18
Jennifer Pagach
Jim Luce
Lydia Pan
Manuel Lizarralde
Robert Askins
Moriah McKenna '17
Susan Hardy Brown
Susan Munger

Program assistants

Caroline Driscoll '84
Georgia Hann '18
Isabelle Smith '19
Sally Taylor

Arbo Project Guides

Emily Crocker '18
Gavriella King '19

Haruko Tateyam '20
Isabelle Smith '19
Jack Beltz '18
Jonathan Monderer '20
Josh Lee '18
Lydia Pan
Marcus Vinicius '20
Pam Wright

Gardners

Bob Catuccio
JoEllen Vasbinder
Maggie Perkinson
Ronald Cummings

Student Advisory Committee

Caroline Longacre '19
Emilio Pallares '19
Isabelle Smith '19
Jack Beltz '18
Josh Lee '18
Moriah McKenna '17
Virginia Gresham '17

MEMBERS

The Arboretum gratefully acknowledges gifts from the following individuals and organizations who contributed this year either directly, or through the establishment of endowment funds, which provide support every year. We strive to accurately maintain our records and appreciate receiving corrections.

PATRONS

Community Foundation of Eastern Connecticut
Further Forward Foundation (formerly Sun Hill)
John & Linda Abel Fossean '69
Estate of Lucy Holcombe '46
Linda Lear
Susan E. Lynch '62
Joanne McKean Morton '76
Sylvan Nursery

Urban Forestry Organization
Neil & Sylvia Van Sloun
Van Sloun Foundation
Wertheimer Estate

SPONSORS

Mary Augustiny
CT Land Conservation Council
Helen F. Dayton
Glenn MA '83 &
Wendy Dreyer
Craig Dutcher



JACK BELTZ '18 WAS THE VOLUNTEER LEADER OF A BIRDING BY EAR PROGRAM THAT UTILIZED THE NEW BOG BOARDWALK.



**EASTERN TIGER
SWALLOWTAIL ON
AESCULUS PARVIFLORA**

Prescott Hafner
Margaret H.
Harlow '87
Comcast Corporation
David Moulton
Stephen E. Record
Claudia Redfern
Peter & Susan Rand '65
Rotch
John and Linda Sargent
Thomas Sargent '82
& Allison Ijams '82
Kathryn & John
Williams
IBM Matching Grants
Program

**SUPPORTING,
FAMILY,
ORGANIZATION
(NON-PROFIT),
INDIVIDUAL &
STUDENT**

Anonymous
Renee Mercaldo
Allen '84
Nancy Clark '53 &
Dexter Anderson
Maureen McCabe &
Jeffrey Andersen
Platt '64 & David
Arnold
Eleanor C. Babbitt '80
RoseMarie Bagioni

Amey Bailey '86
Bridget Baird
Nels '78 & Juliana
Barrett
Terry Bischoff
Diana N. Blair
Carol Booth
Sara Bradford '63
Branford Garden Club
Marcia & Howard
Brensilver
Elizabeth Smith
Brobst '54
Claire Calabretta
Vonice Carr
Sheila Clark
William Collins

Kathy Connolly
Christelle Cook '81
Rebecca '98 & Ted
Crosby
Judith Davies
Anne Davis
L. Joyce DeLaura
Sylvia Delson
Quintin Depina
Mary L. Devany
Deborah Donovan
Joann Wayland Doyen
John & Pauline Doyle
Natalie Drenzewski
Caroline Driscoll '84
East Haddam Garden
Club

Marilyn Eastwood	Lydia Pan & Mark	Anne H. Nalwalk	Peter & Terri Roper	Tomorrow's Trees, LLC
Marylynn & Dennis	Kronenberg	Kathy Niver	Helen Rowe-Drake	Trillium Garden Club
Fallon	Donna J. LaBranche	North Stonington	Marlene Santucci	Martha Twigg
Daniel Fitzgerald	Jill Leinbach	Garden Club	Elaine & Mark	Catherine & Pieter
Ken & Joan Flynn	Amanda A. Lindberg	Lesley S. Orłowski '73	Schleicher	Van Dine
Mark Gershman	MA '75	Elizabeth Ann Otto '72	Marian	JoEllen Vasbinder
Mary Helen &	Longwood Gardens	Benjamin Panciera	Shilstone MA '80	Julie Wainscott
Timothy Goldsmith	Library	Rebecca Parmer	Alida Liesbeth Slosberg	David Walther
Kenneth & Nadine	Andrew Lopez	Chris Penniman	Christine Smith	Scott & Joan Warren
Graham	Dorothy Luckraft	Pfizer Foundation, Inc	Ginger Smyle	Wendy & Jeff
Kari Hammen	Ronald & Gloria	Betty Pinson	John & Frances	Westerlund
Christie Hayes	Manning	Brian Pistolese	Steffian	Westport Garden
Adelaide Henderson '65	Heather L. Manwaring	Marcia W. Porter	Stonington Garden	Club
Penelope Howell-	Bill & Nancy Marston	Maggie Redfern	Club	Katherine Doak
Heller '75	Lyndon McAllister	Elizabeth Field	Sally L. Taylor	Winslow '90
Anne Isbister	James & Ellen McGuire	Reynolds	Thames River Garden	Karen Wolfskehl
Timothy Jackson	Becky Miller	Ric Ricci and Fawn	Club	Melvin Woody
Margaret Steele	Eileen & Richard	Walker	The Glastonbury	
Kaczorowski	Morange	Susan G. Richards '54	Garden Club	
Tom Kalal	Sandra S. Morse	Pamela Richardson	Thomas M. Tobin	
Shannon Kelly	Susan H. Munger	Riverside Park	Charles T. Tillery &	
Karen Krohn & John	Bob & Sally Myers	Conservancy	Mary Villa	
Pedergast	Mystic Garden Club	James Robinson	Mary Anne 'Bee' Tilney	

● CONNECTICUT COLLEGE

Pamela D. Zilly '75, *Chair of the Board of Trustees*
Katherine Bergeron, *President*
Abigail A. Van Slyck, *Dean of the Faculty*

ARBORETUM STAFF

Glenn D. Dreyer MA'83, *Director*
Maggie Redfern, *Assistant Director*
Mary Villa, *Curator/Information Manager*
Leigh Knuttel, *Horticulturist*
Bryan L. Goulet, *Senior Groundsperson*
Kraig Clark, *Groundsperson*
Christine Donovan, *Department Assistant*

ASSOCIATES

Robert A. Askins, *Research Associate*
Phillip T. Barnes, *Research Associate*
Beverly A. Chomiak, *Research Associate*
John W. Deering, *Earth Management Consultant*
Anthony P. Graesch, *Research Associate*
Pamela G. Hine MA'84, *Research Associate*
Chad C. Jones, *Research Associate*
Manuel Lizarralde, *Research Associate*
Stephen H. Loomis, *Research Associate*
T. Page Owen, *Research Associate*
Douglas M. Thompson, *Research Associate*
R. Scott Warren, *Research Associate*

CAMPUS GROUNDS STAFF

James Luce, *Grounds Supervisor*
Lewis Bowker, *Arborist*
Ron Burrige, *Mechanic*
Geoff Burdick, *Groundsperson*
Mike Campagna, *Groundskeeper*
Nick Korenkowicz, *Groundsperson*
Lynn Manza, *Groundskeeper*
Kevin Marshall, *Groundsperson*
Tom Nazarko, *Groundsperson*
Dan Popinchalk, *Groundsperson*
Joe Serwinski, *Senior Groundskeeper*



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