At Lehigh, research is branching out in new directions.

**CULTIVATING RESEARCH**

The Faculty Innovation Grant program is expanding the university's research portfolio by encouraging faculty members to boldly explore new areas. Page 16

The recent rediscovery of the long-forgotten arboretum is providing unprecedented opportunities for research and teaching. Page 26
Kayla Virgone ’14, an earth and environmental sciences major, takes notes as part of Professor Robert Booth’s general ecology class in the long-forgotten Lehigh University Arboretum.

Photo by Douglas Benedict
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The rediscovery of Lehigh’s long-forgotten arboretum is providing unprecedented opportunities for teaching and research, all within the confines of campus.

Bob Booth can see the trees through the forest. Where most people see merely a wooded expanse on Lehigh’s Mountaintop campus, Booth, associate professor of earth and environmental science, sees the meticulous work of a former faculty member and fellow ecologist who arduously created Lehigh’s first arboretum and tree plantation more than 100 years ago.

This experiment in forestry sat unknown and untouched since the mid-20th century until Booth made a surprising discovery right in his own backyard. Today, the arboretum and tree plantation is providing unprecedented opportunities for teaching and research, all within the confines of Lehigh’s own campus.

“The recent rediscovery of the arboretum and experimental forest presents a unique opportunity to examine how these areas have changed over the past century,” Booth says.

Booth’s act of forensic ecology first started in one of the most unglamorous of places: the basement of Williams Hall. After the earth and environmental sciences department relocated to the “greener” pastures of the STEPS building, Williams was left mostly vacated, aside from a herbarium, a collection of preserved plant specimens that had been built up over many years by many of Booth’s predecessors.

While restoring the herbarium to make it more useful in his teaching and research, Booth noticed that much of the collection came from Francis J. Trembley, a Lehigh professor and pioneer ecologist, who collected specimens from throughout the Lehigh Valley in the 1930s. Some of these plants were collected from the Lehigh University Arboretum. As an ecologist, Booth was surprised he had never heard of the Lehigh University Arboretum.

Booth turned to archives and special collections librarian Ilhan Citak, who found the first clue in Lehigh historical documents. Robert W. Hall, Lehigh’s first professor of biology, left a written document outlining his efforts in the early 1900s to establish an arboretum where “all sorts of trees could be quickly observed and where the various forestry procedures; seed bed, transplant beds, etc., could be demonstrated.”
“The University Archives is the memory of the institution that helps to construct a solid vision for the future,” says Citak. “Preserving, organizing, cataloging and providing access to the historical resources for understanding what Lehigh is about has been our mission.”

Hall’s arboretum and tree plantation of native species was intended to aid in Lehigh’s conservation efforts and help establish a full-fledged forestry program.

In his 1909 opening day address, President Henry S. Drinker announced the acquisition of land for the arboretum by saying, “One of the most important public questions of the day is the conservation of our natural resources. People are waking up the truths that engineers have known and sought to enforce, and now that our Public Authorities are generally and intelligently interested—it is the duty of institutions like Lehigh to take active share in the spread of knowledge of these matters.”

Booth and Citak were excited by the discovery, but the arboretum’s whereabouts remained a mystery. Hall’s document described the location only as south of the university, where “the mountain rises steeply and is wooded. Back of Williams Hall a brook flows down, whose origin is in the arboretum. Not far above the southern edge of Sayre Park the land flattens out in an almost level valley which stretches a half mile or so rising gently to where the wooded mountain again rises steeply to the summit. The arboretum land lies on this gentle slope with a northern exposure.”

Using Hall’s notes as a guide, Booth and several of his graduate students hiked around South Mountain, but found nothing to suggest the presence of an arboretum. He says he “returned to his office rather depressed,” but not defeated.

One important clue was then discovered—a 1915 article written by Natt M. Emory, then-Vice President of Lehigh. This article confirmed that a demonstration tree plantation was established adjacent to the arboretum and outlined the 22 species and 8,600
trees—white pine, sugar maple, yellow birch, black cherry—that were planted in carefully measured plots.

Booth matched the detailed drawing of the plantation plots, which showed evergreen conifers outlining the northern and eastern margins of the plantation, to a 1939 aerial photograph taken in early spring before the deciduous trees had leaves. Booth was able to identify the plantation on the map using the conifers as his guide. The pine and spruce seedlings planted by Hall more than 100 years ago survived and revealed to Booth the location of Lehigh’s forgotten forest.

“As an ecologist, I thought wow, we could actually do some really interesting science here,” Booth says. “We have an experiment in forest planting and ecological succession that was meticulously set up a century ago. Twenty-two plots were originally established, each planted with different species of trees. It’s rare to find a situation like this, where we know exactly what species were planted 100 years ago, and it allows us to assess how a century of ecological succession and change has affected plots with different starting vegetation.”

In the fall semester, Booth challenged the students in his general ecology class to investigate the present-day species composition of the plantation, informing them that they would be the first ecologists to look at how this experiment played out over the past century. Using the original plantation drawing, the students mapped the area, identified the original trees and those that have grown in since, and carefully measured the location and size of each tree.

“It’s pretty rare to find something that’s been untouched for 100 years,” says Kevin Barrett ’12. “I try to imagine what it looked like when [Hall] came out here. It must have had perfect rows and paths. It’s pretty honorable to try to re-establish what this man set up.”

Nearby, Amber Lutey ’13 was working on...
a plot that was originally planted with white pine. Lutey says while some of the surviving white pine made the plot easy to map, black birch had grown in where white pines died off. She says that tells her that black birch is likely an opportunistic species, and was able to establish quickly in the spaces created when the pines died.

“This is so much better than sitting inside,” she says. “It’s very cool that we are some of the first people to do research here and investigate this forest. We’re learning how to recognize trees, and that’s a lot of fun.”

Not long after students finished mapping the plots, a Halloween-weekend nor’easter swept through campus leaving hundreds of fallen trees in its wake.

“There is a lot of tree damage,” says Booth, adding that smaller trees such as the red maples and cucumber magnolias were hit pretty hard. Among the big trees, several European larches were damaged or toppled along with at least one large oak. Booth and his students plan to quantify the tree damage. “It will be interesting to see what species benefit from the tree mortality and associated disturbance caused by the unusual early-season snow storm,” Booth says.

Booth hopes that down the road the university will officially mark and label the old trees in the now-forested arboretum, and create trails through the plantation and arboretum, so that everyone from Lehigh can recognize and appreciate the work first established on the mountain more than 100 years ago. He and other professors in the earth and environmental science department intend to continue to use the area as a unique outdoor laboratory for teaching and research.

Hall, Drinker, and Emery would all be pleased with work that Booth and his students are carrying out on the mountain. In his 1915 article, Emery wrote, “…there was present in my mind the great advantage to foresters of the future who could see what those of the present day were unable to ascertain—the adaptability of certain species to certain soils, location, and environment—and thus have set before them an object lesson of great value.”