I spent this summer in Sewanee on campus as a biology and forest ecology intern with the Biology department. This is the second summer that I have been fortunate enough to be on campus doing biology research. My research was conducted out of the Sewanee Herbarium with Dr. Jon Evans as my research advisor. This summer’s research team consisted of two undergraduate students – myself and Kimberly Williams (C’17) – and two alumnae graduate fellows, both current students at the University of Georgia – Ashley Block (C’13) and Callie Oldfield (C’15). Our daily responsibilities varied greatly from week to week, allowing me to experience quite a few different aspects of botanical research. Most importantly, over the course of the summer, I had the chance to learn one of the most challenging things about science: sometimes, things do not go as planned.

The original project that I hoped to pursue this summer was a population genetics study of the recently described native bamboo species *Arundinaria appalachiana*, hill cane, which is found on the Cumberland Plateau. Hill cane, like other bamboo species, grows in large, asexual clones that prefer wet soil, such as can be found in creek drainages. By studying the genetic structure of the populations found in Franklin State Forest (Franklin & Marion Counties, TN), I hoped to determine past patterns of colonization and growth across the landscape. This study would have been in collaboration with lab alumna Dr. Ashley Morris (C’97), a professor at Middle Tennessee State University, and Sewanee biology professor Dr. Elise Kikis. In order to compare one individual to another using their genes, species-specific DNA markers called microsatellites are utilized. Identifying appropriate microsatellites takes time and sequencing expertise outside the scope of this study, but I hoped to use markers developed for a related
bamboo species native to China. Unfortunately, preliminary analysis of these markers produced problematic results. The hill cane samples had to be sent to Cornell University to be sequenced and have new microsatellite markers identified. This set the study back the length of time that it takes Cornell to process and return results; to date, the hill cane samples still do not have identified microsatellites.

Rather than sit idle, I was involved in a number of projects. I spent two days shadowing and assisting state botanists as they monitored an endangered species, large-flowered skullcap (Scutellaria montana), and became familiar with the census techniques that help conservation agencies assess the status of small populations. I worked several afternoons in Dr. Kikis’ lab in Sewanee, learning how to perform RNA and protein electrophoresis on the model organism Caenorhabditis elegans, a small nematode (roundworm), and helping her summer lab intern, Hailey Ung (C’19) perform maintenance on the C. elegans population used in the lab. I assisted graduate fellow Ashley Block in re-sampling vegetative plots located at the King Farm on the Domain, which involved measuring and identifying tree species both inside and outside the boundaries of an abandoned farm site. Involvement in this wide variety of small projects gave my summer a breadth and depth which I would not have gained otherwise.

However, my main project for the summer became the assessment of living, aboveground biomass in long-term forest census plots located in nearby Franklin State Forest. The five one-hectare plots were set up in the 1970s by George Ramseur and were the subject of my summer 2015 internship with the Sewanee Herbarium. During last year’s internship, I, and a team of four others, including graduate fellow Callie Oldfield, measured and identified every tree
in the five hectares of forest. Using these diameter measurements, I was able to calculate biomass and compare it with the biomass of the forest during the last three censuses, which occurred in 1978, 1998, and 2005. I found that biomass is no longer significantly increasing in Franklin State Forest, which is different than some northeastern forests of comparable age, and that it has reached an average biomass weight of 225.1 Mg (megagrams) per hectare. This is higher than I would have expected for a site on the Cumberland Plateau when compared to other studies which describe biomass on sandy soils. My results raise a lot of additional questions to explore as I prepare a manuscript suitable for publication. I will continue to address these questions during an independent study with Dr. Evans in the fall semester, and this project has potential to serve as my honors thesis should additional data collection and analysis be needed.

The most exciting result of this summer’s research internship was the opportunity to go to the Botanical Society of America’s annual conference in Savannah, GA. I presented a poster about the biomass research and attended a wide range of presentations in many different subfields of botany. Graduate school is heavy on my mind as I enter my senior year, and I am all too aware that I very soon need to pick a direction in which to move. Hearing from professionals in many of the fields I am interested in was extremely helpful, but most encouraging were the words of Dr. Morris, who I met up with at the conference. She said that she recommends to all of her undergraduate students to get a master’s degree before settling on a field to pursue a doctorate in. Her words, and the insights I gained from the topic talks at the conference, have given me renewed confidence in my decision to be a botanist, and have taught me not to limit myself to one particular career or subfield just yet. This knowledge could not have come at a
more perfect time – coming out of an incredibly stressful junior year, questioning my abilities and every choice I make, this conference was a truly wonderful conclusion to my summer. I am proud to continue my research into the coming year, transforming it into a manuscript and perhaps an honors thesis, and I am thankful for the opportunities granted to me this summer from the internship fund.