For my undergraduate studies, I completed a double major with honors in both biology and computer science and most of my research took place at the intersection of those two subjects. My first foray into original research took place as a sophomore under the guidance of Professor Olberg, a neurobiologist who uses dragonflies as model organisms. My project involved creating a computer model of a dragonfly intercepting prey. Dragonflies are unique because rather than chase down their prey, they fly an intercept course and converge on it in midair. This is something that the most advanced missile interception technology cannot do, yet a dragonfly can accomplish it with ease.

Professor Olberg had conducted previous research that demonstrated that dragonflies taking off on an intercept course calculate their initial launch angle by multiplying the relative angular velocity of the prey by 60. He hypothesized that they continued to use this same method once aloft and my job was to build a computer simulated dragonfly to test this hypothesis. The process of constructing the model proved to be very informative because it forced us to reexamine each assumption as it was parameterized in the model. For example, we had to look back and calculate an exact value for the dragonflies' visual latency, as changes in that value had significant effects on the results of the simulation. In the end, I was able to demonstrate the viability of the hypothesis and presented my research at my school's annual Steinmetz Symposium. This was my first exciting taste of original research and it would ultimately lead me down the path towards more biology/computer science interdisciplinary work.

My next research experience took place that summer at the Oregon State University Eco-Informatics Research Experience for Undergraduates (REU) program. This program brought together undergraduate biologists, mathematicians, and computer scientists in order to work together on ecological research. My group was assigned to investigate potential effects of forest regrowth on the meteorological stations located in the H.J. Andrews Experimental Forest. In the 1960s, three meteorological stations were constructed in areas that had just been clear-cut. Since then, a 50 m diameter area around each station had been kept treeless, but the rest of the forest was allowed to regrow completely unopposed. As a result, the stations were in a small clearing surrounded by 15 m tall trees.

My team took a multi-pronged approach that mirrored our relative areas of expertise. The biologist supervised the surveying of the surrounding trees and took measurements of the canopy light. The mathematician projected the shadows cast by the trees during different times of the year to see if they landed on the data collecting equipment. As the computer scientist, I used the data collected by the stations over the past 40 years to search for changes and trends. In the end we found that while almost all of the measurements appeared to be unaffected by forest regrowth, wind speed showed a significant linear decrease over time and for at least one of the stations, the shadows of the growing trees would begin to reach the instruments within ten years.

For my senior honors thesis, I created a computer model of *Bazzania trilobata*, a species of bryophyte (non-vascular land plants), in order to discover the rules governing its growth and explore the interaction of light within its canopy. This was an interdisciplinary biology-computer science thesis and involved a faculty adviser from each department. The project consisted of two phases: building a model of bryophyte growth and development and then simulating light on that generated canopy. I found that bryophytes use a small number of simple growth rules to create unexpectedly complex structural variation. Using those rules, I was able to construct a model of multiple interacting individuals.

Using OpenAlea, an open source plant modeling package, I was able to simulate and measure light on the "canopy" structure created through the interaction of multiple individual plants. I then compared those results to light measurements from actual specimens and concluded that reflected and transmitted light plays a significant role up to 2 cm deep into the canopy. At the end of the project, I presented my research at the Steinmetz Symposium and I was awarded the Loughry prize for best computer science thesis.

Currently I am working as a field research assistant for Washington University in St. Louis under the supervision of Dr. Tiffany Knight and Dr. Laura Burkle. The goal of the project is to assess the changes in bee diversity and pollination networks in Carlinville, IL that have taken place since Charles Robertson's exhaustive sampling in the late 1800s and early 1900s. Since Robertson, the area was revisited in the 1970s by John Marlin and Wally LaBerge. Taken together, these three collection events should provide a coherent narrative of the changes that have taken place over the past 100 years.

My duties for this project encompass every aspect of the on-the-ground work. In the field, I collect pollinators, identify wildflowers, and conduct vegetation transects. In the lab my duties include pinning, washing pollen from the pollinators, counting pollen, data entry/management, planning out collection and work schedules, and the countless details involved in keeping the project running smoothly. Over time, my role shifted more towards a focus on identification as my skills in that area increased. I started out knowing basically nothing about the identification of bees, and I have now identified over 3500 bees down to the species level and I have also branched out into the identification of flower-visiting wasps and flies. I am fortunate to have started out in an area with one of the most studied bee faunas in the United States, and I look forward to gaining the expertise required to take the next step in finding and describing novel species.