

The first time I truly examined bees and was exposed to their staggering complexity was on March 8th, 2010. It was the first day of a 3-day bee identification course taught by Biologist Mike Arduser from the Missouri Department of Conservation. I was preparing for my new position as a field research assistant on a plant-pollinator interaction study based out of Washington University in St. Louis. We were revisiting the dataset of the entomologist Charles Robertson, who exhaustively and assiduously sampled the bee fauna from every plant species occurring within 10 miles of the town of Carlinville, IL during the late 1800s and early 1900s. My main duties would involve field sampling bees, but the postdoctoral fellow in charge of the study, Dr. Laura Burkle, also hoped that we would be able to assist in identifying the specimens as well. I was excited and eager to prove to Dr. Burkle (who was also taking the course) that she had made a good choice in hiring me.

During the course, I displayed little aptitude for identifying bees. I was unprepared to navigate this new world full of alien-looking insects, dichotomous keys, and endless obscure and confusing terms. Ultimately, it would take months of hard work and additional meetings with Mike Arduser before I started to become proficient at identifying bees. As my confidence grew, I was able to identify more and more difficult specimens, including the notoriously difficult *Lasioglossum* genus. I was able to help my colleagues identify bees and even lent my bee-identification expertise to a separate research project exploring the species-area relationship in Missouri glade ecosystems. To date, I have identified thousands of pollinators down to the species level. I have attained the limit of what I can learn from the endemic Carlinville bee fauna, and I eagerly anticipate learning about additional US and world specimens.

Much of my progress has been built on the hard work of others. In addition to Mike Arduser's excellent tutelage, I was helped tremendously by the resources at Discover Life (a collaborative online bee identification resource), as well as the invaluable keys and descriptions put together by past entomologists and taxonomists, such as Robertson, Mitchell, LaBerge, Michener, and others. Even though their writings and descriptions are generally dry and technical, many aspects of their work, such as Mitchell's descriptions of the Megachilid bees, possess a level of elegance and attention to detail that makes their works a joy to read.

Most of these great bee taxonomists are no longer with us, and the majority of bee identification resources are at least 50 years old. There is a very real need for new researchers to update and advance this area of study. For example, the field of pollination biology is exploding in popularity while bee taxonomy is continuing a gradual decline. There are currently about 100 pollination biologists for every bee taxonomist; thus for every researcher collecting bees, there are very few individuals who can perform confident and reliable identification of those specimens. In addition, the bee fauna west of the Mississippi, especially in the more western states, is poorly studied and new researchers are needed to describe and organize those species.

The field of taxonomy and systematics is entering an exciting new age as modern bioinformatics and genetic techniques such as DNA barcoding become widely available. I feel uniquely

qualified to navigate the novel challenges and opportunities of modern genetic and computer-based methods. My undergraduate degree is in both biology and computer science and much of my research and experience has been spent at the intersection of those two disciplines. I spent one summer as a software intern at a computer database company, working as part of a small team to explore the performance gains of potential software changes. As an undergraduate, I worked as a web technician creating and maintaining the websites of academic departments. I was also treasurer of Virtual Union, a computer and networking club dedicated to providing free web hosting to every member of the campus community. As much as I enjoyed these computer experiences, I came to realize that the work I find most fascinating is in biology; my views shifted to see computer science as a tool for working on biology-related problems.

The summer of my junior year, I attended a Research Experience for Undergraduates (REU) at Oregon State University that focused on eco-informatics research. I worked as a member of an interdisciplinary group comprised of a biologist, mathematician, and computer scientist investigating how forest regrowth affects the measurements of meteorological stations in previously clearcut forests. Working as a team, we were able to come up with much more comprehensive results than would have been accomplished by any one individual. The experience highlighted the fact that collaboration with people in different disciplines is an essential aspect of research. This continued into my senior thesis, in which I combined the research of two professors from the biology and computer science departments and used my programming skills to create a 3-dimensional model of plant canopies.

Following my graduation, I took a position as an AmeriCorps volunteer with the Rocky Mountain Youth Corps. Most of my time was spent on a 10-person backcountry trail crew carving out new hiking trails in the Colorado Rockies. I am proud of the work I did during this time because it produced tangible results that will likely remain for 100 years. My immersion in this pristine wilderness made me sharply aware of both the rarity and importance of the natural world and ecological preservation. Never before had I truly experienced the majesty of nature: nothing else compares to marveling at the hardiness of minute alpine flowers hanging onto the edge of existence at 14,000 feet or watching a mountaintop sunrise that lights up the entire horizon against a backdrop of endless peaks. In the end, this experience inspired in me a passion to study, understand, and preserve our natural environment.

The recent attention focused on the problems plaguing honey bees has sparked a resurgence of interest in matters of pollination and has shown that native bees are an integral part of the environment. Not enough is currently known about native bees, their habitats and impact on the environment. It is my goal to become a bee taxonomist in order to facilitate a broader study and understanding of bees and increase the body of knowledge required to address the environmental challenges we face.