Christina Benedict

*Project Summary*

An “evolutionary arms race” between the predator-prey relationship of bats and insects has developed as a result of evolutionary selectivity. Bats use echolocation as a method of finding their prey, which can be diverted by some insects’ ability to employ hearing-based defenses. Additionally, some insects mimic the appearances of similar, chemically toxic species to avoid bat predation. Certain moths of the Lepidotera order are able to prevent detection by using a hearing organ sensitive to bat echolocation frequencies. The study between bats and moths (or other insects) provides a glimpse into evolutionary factors that help form behavioral patterns of predator-prey interaction.

My project will be performed along with a Connor Lab research study that intends to investigate 1) prey-capture strategies, both predictive and non-predictive; and 2) strategies which a bat may employ in preference to prey species. Previous studies have suggested bat strategies and pursuit patterns in countering insect defenses. However, these studies took place in laboratory settings which likely compromised natural tendencies from both the bats and the insects as well as the natural availability of prey.

For more accurate insight to the natural relationship between bat-insect predation, I will study insect composition of the bat’s natural habitats in both North Carolina and Florida field sites. Specifically, I will construct a light trap to analyze the availability of insect species in the fields based on the quantity of insects captured. A more abundant species within a predator’s dietary precincts would likely increase the chance of successful prey capture. Therefore, data collection on amount and type of insects present in the fields could serve as insight to preferences bats may exhibit towards prey species based on abundance.

*Intellectual Merit*

This project will help support the analysis of bat flight strategies according to prey type. The broader implication adds to studies of the evolutionary competition between bats and insects – are bats able to successfully overcome and capture a species of prey that employs evolved defense mechanisms? The dietary analysis from the bats will show the species of insect the bats ate the most. Based on the insect counts from my light trap, we can determine which species the bat was able to capture despite prey defenses. These results can help explain predator-prey adaptations unaffected by laboratory settings.