

DEPARTMENT OF BIOLOGICAL SCIENCES
COLLEGE OF ARTS & SCIENCES

SUMMER RESEARCH OPPORTUNITIES FOR UNDERGRADUATE WOMEN

FOR APPLICATION YEAR: 2021

PROJECT TITLE: The role of species-specific facial ornamentations in species recognition: Comparison of jumping spider courtship behavior when viewing conspecific, heterospecific, and species with modified hybrid-species faces

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Project Description

Character displacement describes the divergence of certain characters of the organism (e.g. morphology) due to direct or indirect competition between organisms with overlapping geographic ranges. Reproductive character displacement specifically could be a product of selection for enhanced species identification between closely related organisms (i.e. reinforcement selection). For example, geographic regions with syntopic and sometimes hybridizing *Heliconius* butterfly species saw enhanced sexual isolation between the species and distinct preferences in mate morphology.

Jumping spider species may be under reinforcement selection for accurate species identification cues, especially because there may be a higher fitness cost for the misidentification of potential mates due to the prevalence of sexual cannibalism. Additionally, in the salticid genus *Habronattus*, males exhibit a remarkable array of species-specific facial patterns and colorations. The distinct species-specific male facial patterns may be an important species identity signal used during courtship and mating interactions, particularly because females have duller and more nondescript facial colorations and patterns that are difficult to visually distinguish apart by conspecific males (as suggested by the males of many *Habronattus* species—™ indiscriminate courtship behavior to conspecific and heterospecific females alike).

This project will address the question: What role does facial discrimination

play in interactions between sympatric species? To answer this, we will examine how female *Habronattus coecatus* view different male faces, specifically those of conspecifics and heterospecifics within its local community. This project will evaluate the interactive behaviors between conspecific and heterospecific pairs during courtship. We will use several species of jumping spiders from the Edge of Appalachia Nature Preserve in eastern Ohio. Females will view conspecific and heterospecific males with unaltered faces as well as faces modified to look like a heterospecific species or a hybrid faces with mixed features from different species. The student involved with this project may help with the following: field collections, measuring the spectral coloration of the spider faces using a hyperspectral camera, modifying male spider faces (micromanipulation skills will be used here), running behavioral trials in a custom spider arena, and analyzing video data to quantify spider attention and behavior.