

DEPARTMENT OF BIOLOGICAL SCIENCES
COLLEGE OF ARTS & SCIENCES

SUMMER RESEARCH OPPORTUNITIES FOR UNDERGRADUATE WOMEN

FOR APPLICATION YEAR: 2021

PROJECT TITLE: Whatâ€™s in a (spider) face? The perceptual processing mechanisms underlying jumping spider facial evaluation

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Project Description

Many animals have evolved to recognize the eyes of others as an important visual cue for predation detection—subsequently, the region surrounding the eyes (i.e. the face) has been secondarily adapted for intraspecific communication to provide information such as identity, individual quality, and intention for visually guided species such as primates, sheep, paper wasps, and jumping spiders. Human facial evaluations are the most well-studied: we know which facial features are preferentially viewed, the underlying cognitive and neurophysiological mechanisms involved, and the social advantages of accurate facial expression perception. In contrast, we know almost nothing about the proximate and ultimate mechanisms of face perception and discrimination in non-primate animals, despite growing evidence that many species pay attention to the faces of conspecifics.

Jumping spiders provide a promising system to explore fundamental questions about the evolution of facial discrimination, given their exceptional visual capacities and diverse array of facial morphologies across the family. In the genus *Habronattus*, males orient their colorful facial ornaments toward females during courtship, at times displaying even to dead females incapable of providing chemical cues and dynamic motions. Female *Habronattus* likewise pay attention to male faces: the quality of male facial ornaments has been shown to affect female receptivity. These findings illustrate the importance of the face during salticid social interactions, yet it remains unknown how jumping spiders view the face. Accurate facial discrimination by females in these species may be a critical step in species recognition or mate

selection.

This project will seek to establish the perceptual mechanisms of face perception by examining how jumping spiders visually evaluate faces, modified faces, and other complex objects. We will test this by evaluating the attention and behavioral responses of jumping spiders viewing various stimuli on a video playback system. The student involved with this project may help with field collections, running behavioral trials in a custom spider arena, and analyzing video data to quantify spider attention and behavior.