GENERAL INFORMATION

Program sponsor: Princeton Environmental Institute
Position number: B1CST2
Project title: Effects of Urbanization on Vigilance/Foraging Trade-offs in Woodpeckers (Picidae)
Organization/research group: Stoddard Lab
Primary location(s) of internship: Princeton University
Additional cities and/or countries to be visited (if applicable): n/a

Note: If this internship is located in a country with an International SOS risk rating of High or Extreme, final candidates must participate in a travel review process overseen by the Travel Oversight Group (TOG), and obtain safety guidance prior to departure. The University reserves the right to revoke support and funding for travel at any time there has been a significant deterioration in the safety and security conditions surrounding travel arrangements, or in the sector of the country, or countries, where travel is to occur.

FACULTY SPONSOR(s)/HOST INFORMATION

Name(s): Mary C. Stoddard
University Department(s): Ecology and Evolutionary Biology
E-mail: mstoddard@princeton.edu
Website: https://www.marycstoddard.com

INTERNSHIP/RESEARCH PROJECT INFORMATION

Internship/project description:

Woodpeckers (Picidae) serve an important role as ecosystem engineers, as they excavate cavities which can later be used as roosts or nest-holes for other bird and mammal species (Cockle et al, 2011). Studies have shown that urbanization affects abundance, species richness, as well as foraging strategy of woodpeckers via changes in habitat structure such as tree density (Beissinger & Osborne, 1982; Myczko et al., 2014). Urbanization may also impact woodpeckers via more subtle mechanisms such as by altering foraging/vigilance trade-offs, which can potentially affect an animal's fitness (Quinn et al., 2006). For example, anthropogenic noise and/or reduced tree cover may increase the need for more visual vigilance for predators or competitors, thereby reducing the amount of time a woodpecker spends actively foraging. Alternatively, proximity to urban areas may reduce the need for vigilance if predators of woodpeckers (e.g., Accipiter hawks) are less abundant in urban areas. Woodpeckers with differing degrees of camouflaged plumage may also vary in their susceptibility to the effects of urbanization. We propose a student internship to assist with the data collection phase of an investigation into the relationship between vigilance, camouflage, and urbanization.

**Student's role and responsibilities:**

Students will participate in a combination of field and lab work. Students should be comfortable working both independently and part of a team. Responsibilities will consist of the following:

1. reading background literature related to foraging/vigilance trade-offs, camouflage, and the effects of urbanization on avian species.
2. participating in data collection and image/video analysis which may take the form of:
   a. recording videos of foraging woodpeckers in study sites in and around Princeton that vary in their level of urbanization and/or proximity to urbanization;
   b. coding the recorded videos to quantify vigilance/foraging time;
   c. capturing digital photographs of foraging substrates (typically trees) and woodpecker museum specimens at Princeton and/or nearby museums in New York and Philadelphia;
   d. using image-processing software to conduct digital photograph analysis.

The degree to which students will participate in the conceptual direction of the project will depend on the student's previous research experience as well as their personal interests and goals.

**Internship/project learning objectives:**

As a result of participating in this internship, students should develop skills and knowledge in the following areas:

1) development of a hypothesis and predictions based on the literature
2) experimental design
3) data collection, which may include any of the following: behavioral data collection (video) in the field; image data collection (digital photographs); audio recordings; accessing data from GIS; accessing citizen science data from eBird.
4) processing and analyzing data, which may include any of the following: video analysis; image processing using Matlab; acoustical analysis using software such as RavenPro; data analysis using Matlab and/or R.
5) natural history of local birds

**PROGRAM REQUIREMENTS**

**Academic background and any course pre-requisites:**

Biology; Animal Behavior preferred, but not required.

**Technical skills:**

Skills in local bird identification are highly preferred.

Experience working with cameras and an interest in image processing, computing, and video analysis are highly preferred.

**Additional training(s):** n/a

**Equipment:**

Students will need their own laptop and backpack for carrying equipment. The student should have a vehicle for transportation to study sites.

**Physical demands:**

Must be able to spend up to 8 hours a day outdoors in hot, humid weather in areas with potentially many mosquitoes. Must be able to carry somewhat heavy equipment (video camera, digital camera, audio recorder, tripod, binoculars, notebooks).

**Language abilities/competencies (if applicable):**

n/a

**Additional information about the internship/project:**

Students will need to complete lab safety training prior to the start of the internship.
# INTERNSHIP/PROJECT SUPERVISOR(S)

**Name and title of primary supervisor:** Monica Carlson  
**Email:** monica.carlson@princeton.edu  
**Phone:** (919)491-2835

**Name and title of additional supervisor, if applicable:** n/a

**E-mail:**  
**Phone:**

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## PROGRAM DATES AND FUNDING INFORMATION

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**Note:** PEI funding is for full-time work, 35 hours per week minimum, and for a period of at least 8 continuous weeks.

**Application deadline:** January 11, 2019