

**Department of Biology
COLLEGE OF ARTS AND SCIENCES**

**SUMMER RESEARCH OPPORTUNITIES
FOR UNDERGRADUATE WOMEN**

APPLICATION DEADLINE: March 1, 2014

The Department of Biology is pleased to offer the following research project for the summer of 2014. Interested students are urged to contact the faculty member(s) directing the project that most interests them. By contacting the faculty member, you can discover more about the project, learn what your responsibilities will be and, if possible, develop a timetable for the twelve-week research period.

PROJECT TITLE: Dynamics between dormancy and immunity in northern house mosquitoes, *Culex pipiens*

**Professor Joshua B. Benoit
Department of Biological Sciences
711F Rieveschl Hall
Cincinnati, OH 45221-0006
Tel: (513) 556-9714
Fax: (513) 556-5299
Email: Joshua.benoit@uc.edu**

Project Description

Survival of insects in temperate regions is dependent on the ability to overwinter. The northern house mosquito *Culex pipiens pipiens*, vector for West Nile virus, endures winter through a period of hibernation (diapause). Diapause of this mosquito is characterized by a shift from blood to sugar feeding, accumulation of storage lipids, increased resistance to cold and dehydration stress and arrestment of oocyte development. Along with these factors, longevity increases from only a few weeks in nondiapausing females to well over eight months for diapausing individuals. It is likely that these diapausing mosquitoes will be exposed a multitude of pathogens, but it is unknown how these interactions will alter the ability of mosquitoes to survive during the winter. This project will examine the following 1. Immune response in diapausing mosquitoes, 2. Interactions between cold/dehydration tolerance, immune response and pathogen exposure in diapausing mosquitoes and 3. how infections and immune response of diapausing mosquitoes alters their ability of emerge after winter and reproduce. This project will provide training in basics of molecular biology (PCR, gene cloning, qPCR, etc.), assessment of immune response in insects and analysis of RNA-seq data through bioinformatic techniques. The student will be expected to present research from this project at annual University of Cincinnati undergraduate conference and one regional scientific meeting.