We are seeking highly motivated undergraduate students to participate in research projects that investigate the ecology and evolution of speciation in herbivorous insects. There are three major projects from which students will gain hands-on research experiences. First, we are investigating genetic divergence and gene flow between the populations of tumbling flower beetles that use different goldenrod host plants. The aims of this project are 1) to characterize the level and the pattern of genetic divergence within the beetle and 2) to test how local ecological factors (e.g., climatic factors, host abundance, & competition) affect speciation, particularly gene flow, of the beetle. We are using microsatellite DNA markers to explore these questions.

Second, we are examining the evolutionary mechanisms that underpin Earth’s biodiversity. Recent studies suggest that species diversification can create additional biodiversity. Diversification of one species can cause subsequent diversification of other species that utilize resources created by the former species (i.e., sequential speciation). An intriguing question is whether the collapse of primary diversification can subsequently collapse the diversification of higher trophic levels. Using the goldenrod-insect model system and genetic markers, we will conduct greenhouse cage experiments to test this important evolutionary question and its conservation implications. Students will monitor plant and insect populations in our greenhouse and prepare samples for DNA analyses.

Third, we will perform experiments concerning insect behavior and genetics. We will test the plant-seeking behavior of two species of tumbling flower beetles; we hypothesize that their attraction to different host plants for mating plays a key role in their ongoing speciation. In a choice-test apparatus, we will observe their attraction to volatile chemicals emitted by different species of goldenrod host plants. Since neither the sex nor the species of these beetles can be determined by sight, we will sex the test beetles post mortem under the microscope and subsequently identify their species using molecular-genetic techniques. Student researchers will learn the scientific theory behind these experiments and perform all stages of the projects, learning all the techniques involved, including statistical analysis and presentation of the results.

We prefer summer interns who wish to continue their summer research experience for credit during the academic year (i.e., subsequent fall and/or spring semesters). Our lab program features weekly Research Group meetings during which students will present and discuss the scientific theories and methods appropriate to their projects. Internships provide $3,500 for a 10-week summer commitment. We currently have an active research group of seven students and three Ph.D. mentors.

For more information, please contact Dr. Warren Abrahamson, warren.abrahamson@bucknell.edu, Dr. Mizuki Takahashi, mizuki.takahashi@bucknell.edu, or Dr. Catherine Blair, cblair@bucknell.edu in the Department of Biology, Bucknell University, Lewisburg, PA 17837. For more information about the Abrahamson Lab Group’s research, please visit our web site at: http://www.facstaff.bucknell.edu/abrahmsn/.

Applications must be submitted by Friday, March 4, 2011. Internship awards will be announced on Friday, March 11, 2011. Awardees must confirm acceptance by March 25, 2011.
Summer 2011

APPLICATION FOR SUMMER RESEARCH INTERNSHIP

ABRAHAMSON LABORATORY

Fill in the information requested below and return the completed form and proposal to Dr. Abrahamson warren.abrahamson@bucknell.edu or Dr. Takahashi mizuki.takahashi@bucknell.edu, Department of Biology, Bucknell University, Lewisburg, PA 17837 by March 4, 2011.

Name _______________________________________________________________________

Age _________________________ Birth Date _______________________________________

College year completed as of the end of this spring semester (So/Jr) ________________________

Campus mailing address ______________________________________________________________________

____________________________________________________________________________

Phone _____________________ Home address _______________________________________

____________________________________________________________________________

Overall GPA _____________________ Science GPA ____________________________________

List your science courses (with grades) _______________________________________________

____________________________________________________________________________

____________________________________________________________________________

What is your planned profession after graduation? ______________________________________

____________________________________________________________________________

What jobs or internships have you had that have given you an interest or expertise in biological research? ______________________________________________________________________

____________________________________________________________________________

Name & e-mail address of your academic adviser _______________________________________

____________________________________________________________________________

Names & e-mail address of two professors willing to provide a recommendation for you ___________

____________________________________________________________________________

Attach a 2-3 page description of your proposed research plans
(The project description must be developed in consultation with Dr. Abrahamson, Dr. Takahashi, or Dr. Blair prior to submission).