

Undergraduate Summer Research Internships

Department of Botany and Plant Pathology, Purdue University

2011 Application Form
Please PRINT all information

Name:

Email:

Current University Mailing Address:

Home Mailing Address:

Day Phone: ()

Evening Phone: ()

Undergraduate School/Department:

Major:

G.P.A.:

Academic Advisor:

Phone: ()

Please provide the following on separate pages:

1. List all undergraduate science and math courses taken and grades received.
2. Describe any research experience or skills you have acquired from courses or work experience.
3. Include a statement describing your personal career goals and objectives.

In addition, two letters of recommendation are required. Please have your references mail their letters directly to the address below.

Application Deadline: February 14, 2011

Return application and supporting documents to:

Dr. Peter Goldsbrough, Department Head
Department of Botany and Plant Pathology
Purdue University
915 W. State Street
West Lafayette, IN 47907-2054

Phone: (765) 494-4614

Email: goldsbrough@purdue.edu

Applicants will be notified of their acceptance on or before March 14, 2011.

Research Projects

Indicate which projects you would be most interested in working on. In addition to submitting this application, you are encouraged to contact the project lead to express your interest in their project.

	<p>Monilinia and the march of the mutants - Dr. Janna Beckerman Originally described by Luria and Delbrück in 1943, fluctuation analysis is the standard method in the laboratory for calculating mutation rates. However, research by Cairns et al. 1988, challenged not only fluctuation analysis, but our basic understanding of Darwinian principles, and questioned whether mutations occur independently of the environment, and if mutation rates are constant. To date, very little work has been done using this approach to examine the development of mutation in agronomically important fungi. We will be using the brown rot pathogen, <i>Monilinia fructicola</i>, to examine if the development of mutations depends on environmental conditions (presence v. absence of fungicide), the rate of mutation, and if mutations occur in the absence of cell division.</p>
	<p>Maize biodiversity underlying the immune response – Dr. Guri Johal The specific purpose of this project is to explore natural diversity in maize for functional variation of the immune response to pathogens. It involves crossing an 'autoimmune mutant', in which a disease resistance gene of the R type is ectopically expressed, to diverse maize inbreds (of the diversity panel) and then evaluating their F1 testcross progenies for the expressivity of the hypersensitive response (HR) using various measures and assays. The phenotypic data thus obtained is correlated with the genotypic assessments of these lines to identify and map natural genes and QTL capable of modulating the HR response.</p>
	<p>The wonderful world of weeds – Dr. Bill Johnson The estimated average monetary loss caused by weeds in field crops grown in the U.S. is over 4 billion dollars each year. Weed management expenses are one of the largest variable costs incurred by growers annually. Weeds growing on cropland are like crop plants themselves, drawing upon the soil and air for essential elements. Production of food and energy for humans and livestock and the economic well being of U.S. citizens depends heavily on effective, integrated management of weeds.</p>
	<p>Evolution of flood tolerance in wetland habitat specialists – Dr. Nancy C. Emery The “Goldfield” genus <i>Lasthenia</i> is a group of wildflowers that are native to California. Many of these species are restricted to unique wetlands called vernal pools – small, natural depressions in the landscape that accumulate water during the winter months and dry in the summer. Although several <i>Lasthenia</i> species are found exclusively in these wetlands, pilot growth chamber experiments indicate that flooding reduces the performance of all species, including vernal pool specialists. We aim to examine this discrepancy between the distribution of these species in the field (their “realized niche”) and their performance under controlled flooding conditions (their “fundamental niche”) by exploring the evolution of flood tolerance across wetland and non-wetland specialists.</p>
	<p>Proteins regulating plant immunity – Dr. Tesfaye Mengiste</p>
	<p>Hunting for mutants – Dr. Kiersten Wise Some fungal plant diseases have a specific mutation that makes them less able to be controlled by fungicide applications. Typically, these mutants are at low levels in a disease population. However, increased fungicide use can “select” for these resistant strains, resulting in an increase in the mutant population. Monitoring the level of these mutants can help determine if the disease population is shifting in response to fungicide use. This project will use field and lab techniques to hunt for mutants in field crop diseases.</p>
	<p>Molecular responses to a maize kernel environment. Dr. Charles Woloshuk <i>Fusarium verticillioides</i> is a pathogen of maize and can be found wherever maize is grown. The pathogen infects ears and produces the mycotoxins known as fumonisins. The current goal of our studies is to understand the molecular mechanisms that regulate metabolism during the colonization phase of pathogenesis, especially as they relate to kernel infection and fumonisin biosynthesis. We believe that the nutrient environment plays a major role in determining whether <i>F. verticillioides</i> forms a destructive or endophytic relationship with its host and whether the pathogen produces fumonisins, a family of toxic secondary metabolites.</p>

Please contact any of our faculty researchers to discuss a potential summer research project

<http://www.ag.purdue.edu/btny/pages/srp.aspx>