Summer Workshops 2009

Name _____

Address _____

_____

_____

Phone _____

Email _____

Department: _____

GPA : _____

Student Number: _____-_____-_____

☐ 2nd year student ☐ 3rd year student

☐ 4th year student ☐ Other:_____

References-preferably from Science Faculty

_____

_____

Submit application to Biology (B-008)

Contact person: Mitzy Zavala (Secretary)

UPR-Mayagüez Campus, Biology Building
Office B-008

Phone: (787) 832-4040 Exts. 2417, 3837
Fax: (787) 834-3673
E-mail: carysm.zavala@upr.edu

DEADLINE FOR APPLICATION:
May 13, 2009

May 18, 2009–Final Decision -list of participants will be posted next to departmental offices

"Research Oriented Laboratory Enhancements by Module Development for Laboratories"

UPRM- "ROLE MODEL"
University of Puerto Rico
Mayagüez Campus
Biology Department
P.O. Box 9012
Mayagüez, PR 00681-9012

UPRM-ROLE MODEL WORKSHOPS
Summer 2009






B I O L O G Y

May 21 – 22, 2009

"Research Oriented Laboratory Enhancements by Module Development for Laboratories"

Funded by a grant from the Howard Hughes Medical Institute

UPRM Role Model

The goal of the HHMI ROLE-MODEL 2009 summer workshops is to expose undergraduate students to new research areas in the department of biology. Six workshops in the basic disciplines (botany, zoology, microbiology, genetics, immunology and cell biology) will be offered. Students will learn topics and tools otherwise available only when participating in an independent research project. Students will gain content knowledge, invaluable practical experiences and a strong foundation for research. Through the workshops students also will develop essential skills in critical thinking, problem solving and team-work. Each workshop will be taught by a faculty expert in the given field in collaboration with a teaching assistant. Each student may take two of the workshops.

Requirements

1. Participants for the workshops must be undergraduates and have a minimum GPA of 2.50.

2. Each participant may take two workshops. (one on May, 21 and one on May, 22)

3. Each participant must have completed the appropriate courses for the chosen workshops.

4. Each participant must hand in a research interest essay that includes previous research experiences if any.

5. Each participant must request an official transcript sent to "Role Model" Biology Department B-008.

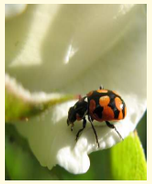
6. Each participant must provide two science faculty names who can provide a recommendation upon request.

**Note: Applications are competitive. Final acceptance will be based on essay, GPA and transcript.

Workshops Itinerary

May, 21 and May, 22

- Welcome Activity (B-392) 8:00-8:15am
- Workshops 8:00-4:30pm
- Snack and lunch will be provided.
- Appropriate laboratory attire required.

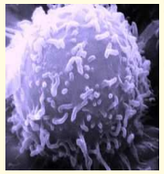


Puerto Rican Invertebrate Diversity Workshop (for students who have completed Biol 3435– Zoology)

Date: May 21, 2009 Place: B-322
Faculty: Dr. Nico Franz

Did you know that hundreds of invertebrate species that live in Puerto Rico are still new to science? In this workshop, participants will start the day off with a 2-3 hour session of collecting invertebrate specimens in the adjacent Miradero Forest (UPRM campus; please wear appropriate clothes!). The collected specimens will then be mounted, labeled and identified using microscopes and a variety of print and digital literature. In the afternoon there will be demonstrations of scientific imaging, databasing, and related collection-based activities. The ideal candidate should have an interest in Neotropical animal diversity, insects and other invertebrates, and enjoy learning about biodiversity research in the field, in the laboratory, and in a scientific collection."

WORKSHOPS DAY 1



Signal Transduction Pathways in Lymphocytes (for students who have completed Biol 4008-Immunology)

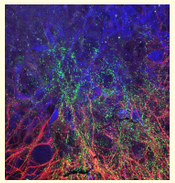
Date: May 21, 2009 Place: B-329
Faculty: Dr. Carlos Acevedo Suárez

Antibodies have become essential tools for basic and applied research, as well as in the clinic. These proteins can be highly specific, allowing for the identification of other proteins that may be scarcely present in a cell. In this workshop, we will be using antibody-based approaches to identify proteins involved in signal transduction pathways in lymphocytes. We will compare the protein profile of resting lymphocytes with that of B and T cells that have been stimulated through their antigen receptors. Participants will be able to apply key concepts related to lymphocyte function learned in the Immunology course to a laboratory research experience.

The Study of Genetic Equilibrium in *Drosophila Melanogaster* using molecular biology (for students who have completed Biol 3300-Genetics)

Date: May 21, 2009 / Place: B-221
Faculty: Dr. Dimuth Siritunga

Population genetics is the sub discipline of genetics concerned with changes in allele frequencies in populations of organisms. If allele frequencies for a particular gene do not vary from generation to generation, the population is said to be in a state of genetic equilibrium for that particular gene. If allele frequencies do change, this is considered to be evidence for the process of microevolution. In this workshop you will study this phenomenon in an artificial population of fruit flies, using a commonly utilized molecular technique of modern biology called the Polymerase Chain Reaction (PCR).
During the workshop you will determine allele frequencies for a particular molecular marker in Drosophila visualized via PCR. The observed allele frequencies will then be compared to the frequencies predicted by the Hardy-Weinberg theory of genetic equilibrium. You will use PCR to assess the genotypes of a large number of flies from an artificial population.



Protein Fingerprinting
(for students who have completed Biol 3010– Cell Biology)

Date: May 22, 2009 Place: B-329
Faculty: Dr. Franklin Carrero

Every single cell in an organism has the genetic information (DNA) to code for every single protein in that organism. During development, cells migrate, become specialized and produce a different set of proteins, depending upon their function. In this activity each participant will propose a hypothesis and design an experiment based on available samples. We will have samples from different organisms and different tissues (skeletal muscle, heart muscle, liver, etc.). At the end of this activity you will be able to determine whether each cell type and/or organism make the same (or different) proteins and assess their basic cellular organization through the use of a combination of basic microscopy techniques and protein fingerprinting by SDS-PAGE electrophoresis.

WORKSHOPS DAY 2

Plant Tissue Culture and the Effects of Plant Growth Regulators (for students who have completed Biol 3417-Botany)

Date: May 22, 2009 Place: B-020 /B-351
Faculty: Dr. Dimuth Siritunga

Plant tissue culture is an important tool in both basic and applied studies as well as in commercial applications (including plant biotechnology). Overall, plant tissue culture is based upon on the theory of totipotency, that is, the genetically based ability of a cell or a nonembryonic organ to form all the cell types in the adult organism. In this workshop you will use African violets (*Gloxinia* sp., Fam. Gesneriaceae) to gain experience in plant tissue culture techniques. African violets are easily tissue cultured as they usually propagate very easily from leaf cuttings. You will use a portion of African violets leaf to observe different stages of plant tissue culture. You will learn how to takes a part of the plant from *in vivo* ("life") to *in vitro* ("glass") by the establishment of an aseptic technique as well as the ways to multiply plants under *in vitro* conditions. While accomplishing these goals you will learn sterile techniques and media preparation skills that can be directly transferable to other field utilizing tissue culture techniques.

Molecular Tools for the Characterization of Bacterial Strains in Modern Microbiology
(for students who have completed Biol 3770-Microbiology)

Date: May 22, 2009 Place: B-237
Faculty: Dr. Rafael Montalvo

The Workshop entitled "Molecular Tools for the Characterization of Bacterial Strains in Modern Microbiology" will expose students to techniques currently used for the characterization of bacterial isolates, complement phenotype-based taxonomy with basic molecular methods and reinforce a research oriented approach to the characterization of unknown isolates and distinguish between Gram-positive and Gram-negative bacteria. Another goal is to recognize advantages and limitations of the experimental methods used and how these affect the interpretation of results. This workshop is up to date with recommendations from the FDA which are to implement DNA-based identification of microbes of relevance in the sterile drug manufacturing setting and to increase the frequency of DNA amplification methods in clinical diagnosis of infectious diseases.

Indicate your 1st and 2nd choice for each day **
(***Student may take 1 workshop per day)*

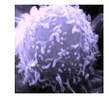
DAY 1

Preference
1rst 2nd

ZOOLOGY

☐ ☐ Title: Puerto Rican Invertebrate Diversity Workshop
Date: May 21, 2009 / Place: B-322
Faculty: Dr. Nico Franz

IMMUNOLOGY



☐ ☐ Title: Signal Transduction Pathways in Lymphocytes
Date: May 21, 2009 /Place: B-329
Faculty: Dr. Carlos Acevedo Suárez

GENETICS

☐ ☐ Title: The Study of Genetic Equilibrium in *Drosophila Melanogaster* using molecular biology
Date: May 21, 2009 / Place: B-221
Faculty: Dr. Dimuth Siritunga

DAY 2

Preference
1rst 2nd

MICROBIOLOGY

☐ ☐ Title: Molecular Tools for the Characterization of Bacterial Strains in Modern Microbiology
Date: May 22, 2009 /Place: B-237
Faculty: Dr. Rafael Montalvo

BOTANY

☐ ☐ Title: Plant Tissue Culture and the Effects of Plant Growth Regulators
Date: May 22, 2009 /Place: B-020/B-351
Faculty: Dr. Dimuth Siritunga

CELL BIOLOGY

☐ ☐ Title: Protein Fingerprinting
Date: May 22, 2009 /Place: B-329
Faculty: Dr. Franklin Carrero