

PROMOTING STUDENT RECRUITMENT AND RETENTION IN THE ANIMAL SCIENCE DISCIPLINE BY ENHANCING MOLECULAR BIOLOGY SCIENTIFIC INSTRUMENTATION FOR TEACHING

Award 2008-38422-19134 \$250,000

P.I.: Guillermo Ortiz-Colón
Co-P.I.: Melvin Pagán-Morales
Department of Animal Science
College of Agricultural Sciences
University of Puerto Rico, Mayagüez (UPRM)

CSREES/USDA Relevant Priority or Mission Area:

- Scientific Instrumentation for Teaching
- Student Recruitment and Retention
- Curricula Design, Materials Development, and Library Resources



Objectives:

1. Acquire all the equipment needed to establish a state-of-the-art instructional laboratory focused in molecular biology applications to the animal sciences.
2. Develop and deliver a day long recruitment training program (8 hours of instruction) to provide 78 extension agents, representing the 78 counties in Puerto Rico, with the content, materials, and training of proper surveying methods, needed to launch a successful recruitment campaign.
3. Evaluate the attitudes and knowledge of high school students (and academic advisors), from the 78 counties in Puerto Rico, towards the College of Agricultural Sciences at UPRM by survey methods.
4. Implement a 4 week summer research program at the Department of Animal Science at UPRM where 8 students (sophomores and juniors) representing eight different high schools, will participate after competitive application. At the end of this program students will be able to:
 - a) perform DNA isolation, polymerase chain reaction, and DNA electrophoresis
 - b) perform RNA isolation, RNA electrophoresis, and hybridization procedures
 - c) perform protein isolation, protein electrophoresis, and immunoblot procedures
 - d) grow cells in culture and isolate their DNA, RNA, and proteins
 - b) give a 10 minute presentation to expose and defend research findings to the program participants, undergraduate students, graduate students, and invited faculty
 - c) write a 5 page long research report about their findings

A disproportionate number of food and agricultural science students are present in low-level, required English courses at the UPRM. Consequently, we will provide English instruction to the students in the summer research program. After 20 hours of English instruction focused on scientific communication, students will be required to write an abstract of their research in English. In addition, students will be required to give a 5 minute oral presentation, also in English, to all the participants of the summer research program.

5. Develop a new course, Animal Biotechnology, for the Animal Science Curriculum. The laboratory of the course will be conducted in the new facilities.

Activities:

Recruitment Training Program (Fall 2008)- At the beginning of each academic year during the duration of the project, a recruitment training program will be delivered to the agriculture extension agents. In order to enable extension agents to fully engage in an effective recruitment campaign the PI and Co-PI will first give an exposition of the current recruitment situation at the College of Agricultural Sciences at UPRM and its Department of Animal Science. Efficient oral presentation techniques will be discussed, and sample recruitment talks will be delivered by the PI and Co-PI.

Evaluation of the attitudes and knowledge of high school students (and academic advisors) towards the College of Agricultural Sciences at UPRM by survey methods. (Spring 2009)- Schools (n=139) will be approached by the extension agents. The extension agents will target 20 students per each academic level (sophomores, juniors, and seniors). The agent then will proceed to provide a pre-seminar survey to the students and the academic advisor. Then the agent will proceed to give an hour talk about the College of Agricultural Science, emphasizing the new molecular biology facilities and accompanying projected curricular changes. At the end of the talk a post-test will evaluate changes in ideas and attitudes towards the College of Agricultural Sciences.

Summer Research Program (Summer 2009)- A 4 week summer research program will be held at the Department of Animal Science at UPRM where 8 students will participate after competitive application.

Develop a new course, Animal Biotechnology, for the Animal Science Curriculum. (Spring 2009)- The course will be developed based on the current state of knowledge in the application of molecular biology techniques to the animal sciences.

Beneficiaries:

High school students (n=8,000) from all over Puerto Rico will be exposed to an hour talk about the College of Agricultural Science, emphasizing the new molecular biology facilities and accompanying projected curricular changes.

Animal Science Majors (30 students per academic year) will have the opportunity to intensively study the application of molecular biology concepts to the production and improvement of domestic animals in the new course Animal Biotechnology.

Evaluation:

The following documents will be used to analyze and report the effectiveness of this project in meeting its established objectives:

1. Survey results of high school students' knowledge and attitudes towards the College of Agricultural Sciences and the Department of Animal Science (before and after the orientation)
2. Survey results of high school academic advisors' knowledge and attitudes towards the College of Agricultural Sciences and the Department of Animal Science (before and after the orientation)
3. Students' evaluations of orientation presentations and materials
4. Students' evaluations of summer research program
5. Diagnostic tests offered to the students at the beginning and end of the summer research program
6. Diagnostic tests offered to the students at the beginning and end of the Animal Biotechnology semester courses
7. Recruitment data from the College of Agricultural Science retrieved from the Institutional Statistics Database and used to compare recruitment rates before and after the recruitment campaign

Expected Impact:

- Thirty animal science majors who take Animal Biotechnology will be able to perform molecular biology protocols correctly at the end of one semester of study. Progress will be considered satisfactory if at least 80% of the students can successfully perform the techniques.
- After participating in a 4 week summer research program, 8 high school students will be able to perform basic molecular biology protocols, give a 10 minute presentation about research findings, and write a 5 page long research report about their findings. Progress will be considered satisfactory if at least 75% of the students (6/8) can perform the protocols.
- The attitudes of 8,000 high school students towards the College of Agricultural Sciences at UPRM will be measured. Based on this information, a new recruitment program will be developed and delivered. The program will be considered satisfactory if enrollment in the College of Agricultural Sciences and the Department of Animal Science increases by at least 10%.
- The proposed facilities will renovate the physical and intellectual environment in Animal Science Department at UPRM, promoting faculty and student research activity. Consequently, the flow of scientific data from the Animal Science Department in areas prone to secure external funds will be increased, enabling our faculty to better qualify for competitive grant funding opportunities.