

Title of Project: UBM-Institutional: Team Research Training Program in Biology and Mathematics. This is an interdisciplinary research program funded by the National Science Foundation and aimed to provide long-term research experiences for Biology and Mathematics undergraduate students.

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Grant duration (start and end dates): October 15, 2007 - September 30, 2012

Other partner schools: None

Any other relevant information on the grant: The program also promotes curriculum changes in UHD's programs in Biology and Mathematics, e.g., the creation of a new Calculus sequence for Life Science majors.

Student/Faculty research:

The NSF-UBM program has given students opportunities to participate in interdisciplinary research in Biology and Mathematics. Each of the current 5 research teams has faculty and students from the Natural Sciences Department and the Computer & Mathematical Sciences Department. The program has given particularly unique experiences for the students as the Mathematics majors help out in doing field work and in performing laboratory experiments while the Biology majors learn more about mathematical, computational and statistical techniques in guiding the team's research. Participants of the program have also presented their research in various conferences in the United States and Canada.

Research projects range from the study of fungal populations along Buffalo Bayou, diatoms on the Anahuac National Wildlife Refuge and the Greens Bayou Mitigation Bank and effects of Pierce's Disease on Texas vineyards to the study of frog embryo development and bacterial biofilm formation.

Dr. Poonam Gulati (NS) and Dr. Youn-Sha Chan (CMS) head one of the research teams. In this team's project, the mechanism of bacterial biofilm formation is investigated. Aside from employing qualitative and quantitative biochemical and molecular analyses in studying the formation of biofilms, mathematical models using differential equations are also used to address proposed questions. Since the start of this project, three Biology majors (Benedict Khoo, Angelica Medina and Russell Kendrick) and three Applied Mathematics majors (Whitney Bass, Jamal Dawson and Miranda Phan) have been involved in the research work. Some of the team's work has been published in the MicrobeLibrary.org website (Khoo, Benedict and Gulati, Poonam. "Developing and Mature Biofilms of *Mycobacterium smegmatis*." February 2009.

http://www.microbelibrary.org/asmonly/details_print.asp?id=2845&lang).

Another research team is led by Dr. Akif Uzman (NS) and Dr. Edwin Tecarro (CMS), in collaboration with Dr. Amy Sater (Department of Biology and Biochemistry, University of Houston). In this team's project, mathematical models are developed to further investigate biochemical signaling pathways involved in the development of a frog embryo. These models incorporate experimental results in the literature and predictions from these models aid the design of further biological experiments. Since the start of this project, one Biology major (Tung Bui) and two Applied Mathematics majors (Marsida Lisi and Rashmi SubbaRao) have been involved in the research work. Initial findings of this research team have been written in a manuscript that has already been accepted for publication in the American Institute of Mathematical Sciences Proceedings.