



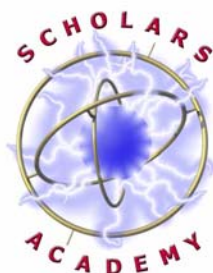
University of Houston-Downtown

## PROGRAM

# 5<sup>th</sup> ANNUAL GRADUATE SCHOOL AND INTERNSHIP FAIR

Sponsored by the UHD Scholars Academy

Funded by the National Science Foundation, U.S. Army Research Office,  
U.S. Department of Education, and the U.S. Office of Naval Research



Friday, November 5, 2004  
UHD Special Events Center



## 5<sup>th</sup> Annual Graduate School and Internship Fair



### Welcome Address

On behalf of the UHD Scholars Academy and the College of Science & Technology, we would like to welcome you to the 2004 Scholars Academy Graduate School & Internship Fair. The UHD Scholars Academy (SA) is a competitive academic program for undergraduates majoring in science, technology, engineering and mathematics (STEM) fields. The SA works to increase the number of academically capable students graduating with degrees in STEM fields and to increase the number of those choosing to pursue graduate study in these fields. This year the Scholars Academy has grown to 170 students. Most of these students are in attendance today along with other students majoring in the STEM fields.

This year, we are proud to announce the inclusion of a Student Poster Presentation Session as part of the Graduate School Internship Fair. The research work presented in these select scientific posters are the result of independent student research conducted on the UHD campus or at collaborating institutions. Our student driven research has served as a springboard for presentations at regional and national scientific conferences. All students in the SA are encouraged to participate in an independent research project during their undergraduate career and approximately 50% of the SA students do. This past summer, 66 students participated in independent research activities, with 16 off-campus interns at the Texas Medical Center, Rice University, and UTMB, as well as out-of-state research facilities. Last year's cohort took research posters to the national Sigma Xi, Texas Academy of Sciences, and local meetings within their disciplines, and eight won awards for their work.

We hope you enjoy your time at UHD with our students and Scholars, and we all look forward to collaborating with you and your institutions in the future.

Sincerely,

Vicky Estrera, Ph.D.  
Director of the UHD Scholars Academy

Akif Uzman, Ph.D.  
Chair, Dept. of Natural Science



**5<sup>th</sup> Annual  
Graduate School and Internship Fair**



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## **Program Schedule Friday, November 5, 2004**

8:00 - 8:30 am	Registration and Check-in
8:45 - 9:30 am	Student Poster Session and Breakfast Mixer
9:45 - 12:00 pm	Graduate School and Internship Exhibits
12:15- 1:30 pm	Lunch for invited guest, faculty and student poster presenters

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### **Conference Organizers:**

**Dr. Vicky Estrera, Director, Scholars Academy, UHD**  
**Mr. Rene Garcia, Program Coordinator, Scholars Academy, UHD**  
**Dr. Akif Uzman, Chairman, Department of Natural Sciences, UHD**

### **UHD Scholars Academy Co-Directors:**

**Dr. Richard Alo, Executive Director, Center for Computational Science**  
**Dr. Alberto Gomez-Rivas, Chairman, Department of Engineering Technology**  
**Dr. Kenneth Oberhoff, Chairman, Department of Computer and Mathematical Sciences**  
**Dr. George Pincus, Dean, College of Sciences and Technology**  
**Dr. Larry Spears, Director, Urban Center for Student Success in STEM**  
**Dr. Akif Uzman, Chairman, Department of Natural Sciences**

### **SJCN Scholars Academy:**

**Dr. Suzette Mouchaty, Director, San Jacinto College North Campus**



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**Graduate School and Internship Programs in Attendance:**

**American Society for Microbiology  
Education Department**

**Baylor College of Medicine  
SMART Program: Summer Undergraduate Research Training**

**Baylor College of Medicine and Houston VA Medical Center  
Houston Center for Quality of Care & Utilization Studies**

**Chevron/Phillips Chemical  
Kingwood Technology Center**

**Encysive Pharmaceuticals  
Department of Molecular Pharmacology**

**Hispanic Association of Colleges and Universities  
Corporate Internship Program**

**Prairie View A & M University  
Department of Computer Science**

**Rice University  
Brown School of Engineering  
Department of Mathematics\***

**Sam Houston State University  
Department of Biological Sciences**

**Stephen F. Austin State University  
Graduate Program in Biotechnology**

**Texas A & M University  
Department of Biology  
Department of Biochemistry and Biophysics**

**Texas Tech University  
Recruiting Office, Graduate School**

**Texas Woman's University  
Office of Admissions**



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**University of California Berkeley\***

Department of Molecular and Cell Biology  
Medical Training – M.D. / Ph.D.

**University of Houston-Central**

Admissions and Recruitment, College of Pharmacy  
Department of Biology and Biochemistry  
Department of Mathematics

**University of Houston-Clear Lake**

Office of Admissions

**University of Missouri-Rolla**

Office of Admissions

**University of Texas Health Science Center Houston**

Department of Integrative Biology and Pharmacology  
Department of Integrative Medicine  
Graduate School of Biomedical Sciences  
Office of Community and Educational Outreach  
School of Health Information Sciences  
School of Nursing  
School of Public Health  
Summer Research Programs

**University of Texas Medical Branch**

Graduate School of Biomedical Sciences

**University of Washington\***

Medical Scientist Training Program (M.D. / Ph.D.)  
Molecular and Cellular Biology Graduate Program

\* Representatives for this program will not be present, but materials will be available for distribution.

### Student Poster Abstracts:

#### 1. Shared Distributed Memory Architecture and Programming

Taiwo Adebawale

Dr. Hong Lin, Research Mentor, Department of Computer and Mathematical Sciences, UHD

**Abstract:** A parallel processor is a computer made up of multiple processing units linked via Interconnection Networks (IN). The two groups of INs are: shared memory systems are systems where all the processors have access to one common memory; and distributed memory systems have no global or shared memory each processor has its own memory and communicate using message passing. This research will focus on the programming languages used, the issues faced, the advantages and disadvantages of each architecture/system as well as the differences between them when they are compared to one another.

#### 2. NOW and PVM

Nkem Akpunowu

Dr. Hong Lin, Research Mentor, Department of Computer and Mathematical Sciences, UHD

**Abstract:** The definition of Network of Workstations is a group of independent workstations connected through a network. Various means of said connection and different types of networks will be explored briefly. The focus shall be on Clusters, or on NOWs for the purposes of enhancing computational power rather than on the commercial and perhaps more widely used implementation as systems for message passing and file sharing. With the focus being on computational power, an introduction will be made of parallel computing to leverage the computational abilities of a network of workstations working together as a bunch of processors or computers to provide higher performance. The advantages behind this approach will be discussed.

#### 3. Establishing Distributed Computer Security Laboratory

Hassan Asif

Dr. Ping Chen, Research Mentor, Department of Computer and Mathematical Sciences, UHD

**Abstract:** The long-term goal of this project to assist undergraduate universities in integrating computer security into their curriculum. The major component of this project is designing a distributed security lab across the two campuses of University of Houston-Downtown, and University of Houston-Clearlake campus. Currently, the project involves setting up the security lab at the UH-Downtown's campus. This involves designing network prototypes, studying various equipments (servers, switches etc.), and configuring the equipment. Currently, we are in the process of establishing a secure VPN (Virtual Private Network) between the UH-Downtown, and UH-Clearlake campuses.

#### 4. Investigating Mutant Y451F in GluR4 Binding Site Using Vibrational Spectroscopy

Imene Bokhetache

Dr. Vasanthi Jayaraman, Research Mentor, Department of Integrated Biology and Pharmacology, The University of Texas Medical School at Houston, Texas

Dr. Akif Uzman, Faculty Mentor, Department of Natural Sciences, UHD

**Abstract:** Glutamate receptors (GluR) are excitatory ligand-gated ion channels in the brain. We used Fourier transform infrared spectroscopy to characterize the unbound and the glutamate bound states of mutant Y451F in GluR4 subunit. Our results showed that environment of carboxylate groups of glutamate ligand is similar in both wild type and mutant in the glutamate bound state, and that glutamate induces similar secondary structural changes in both mutant and wild type. We saw differences however between the two proteins in the unbound state. These results suggested that the mutant glutamate bound form is similar in structure to wild-type, and that the unbound state is more stable in the mutant relative to wild type.

#### 5. The Structural Characterization of a Mid-Infrared Semiconductor Superlattice

Daniel Brenes, Rebecca L. Forest, Donna W. Stokes, and Jerry R. Meyer

Dr. Rebecca Forrest, Research Mentor, Department of Natural Sciences, UHD

**Abstract:** This study characterizes the structure of a mid-infrared semiconductor superlattice grown by molecular beam epitaxy enabling the optimization of its growth conditions. An x-ray diffractometer was utilized to perform radial scans. A computer simulation modeled the x-ray diffraction intensities for composition, lattice spacing, thickness of the layers, and allowed for interdiffusion at the interfaces of the main layers. Results indicate some mixing of group-V atoms in the main layers, slight thickness variations, and no interdiffusion at the interfaces. This study's conclusions indicate a slight error in the growth of each main layer and the characterization of its average structure.

### 6. Analysis of *Xylella Fastidiosa* in Texas Native Plants

Prince Buzombo

Dr. Lisa Morano, Research Mentor, Department of Natural Sciences, UHD

**Abstract:** Wild plants located in the vicinity of Gulf Coast vineyards constitute a considerable reservoir of *Xylella fastidiosa* (Xf), and therefore are a primary source for bacterial transmission to grapevines by the insects that vector the disease. In this study plant samples were screened for bacterial levels using Enzyme-linked Immunosorbant Assay (ELISA) and positives were confirmed by Indirect Immunofluorescence microscopy and/or Polymerase Chain Reaction. Highly positive plants included *Ilex vomitoria*, *Neptunia lutea* and *Lagerstroemia indica*. Of the 93 plants evaluated approximately 10% were positive. The high number of positives and the asymptomatic appearance of native plants suggest that this bacterium is likely endemic to the Gulf Coast.

### 7. Investigation of *Xylella Fastidiosa* Levels Within Three American Grape Hybrid in a Gulf Coast Vineyard

Kimberly Cantrell

Dr. Lisa Morano, Research Mentor, Department of Natural Sciences, UHD

**Abstract:** *Xylella fastidiosa* (Xf) is a bacterial plant pathogen of grape varieties that causes Pierce's disease (PD) resulting in death to vines and millions of dollars in damage. This research analyzed three American hybrid grape varieties, which are known to be tolerant to PD. Using ELISA, Electrochemical Detection (ECD), Indirect Immunofluorescence Microscopy (IF), and PCR we monitored the Xf level in petioles. One-way Analysis of variance (ANOVA) of ELISA data indicated that the variety Cynthiana had a significantly higher value of Xf ( $P=0.0002$ ) than the other two varieties. PCR and ECD results supported the ELISA data.

### 8. Rheological Behavior to Determine Proper Dispersion and Properties of Single-Walled Carbon Nanotubes Dispersed in UV-Polymerizable Systems

Colin Carandang, Giovanna Patino and Ugo Anyanwu

Dr. Byron Christmas, Research Mentor, Center for Applied Polymer Science Research, UHD

**Abstract:** A study of the rheological properties of UV-polymerizable formulations containing an oligomer, three monomers, a photoinitiator, and varying concentrations of single-walled carbon nanotubes (SWNT) was conducted. SWNT concentrations from 0.1 % to 0.16 % by wt. were investigated, along with the effects of shear rate and thixotropic behavior. It was observed that at higher concentrations of SWNT, the viscosity of the formulations was higher. These findings indicate that relatively strong dipole-induced dipole attractions among the acrylate-functional components and the SWNTs. Relative reactivity of formulations and their thermomechanical properties were also studied.

### 9. Analysis of Alternate Sharpshooter Species Which May Vector the Bacterium *Xylella Fastidiosa*

David Cherian and Jose Jaimes

Dr. Lisa Morano, Research Mentor, Department of Natural Sciences, UHD

**Abstract:** *Xylella fastidiosa* is the bacterium which causes Pierce's disease (PD), a plant pathogen that has been destroying grape vineyards throughout Texas. PD is believed to be transmitted through sharpshooter insects. The goal of our study was to identify vectors of PD in Texas using ELISA tests and PCR methods. From our studies we found four sharpshooter species in high numbers in Texas, and two of them having individuals with significant Xf levels. This preliminary work suggests that the potential harm of sharpshooters differs among species and not all may vector the disease or vector it to the same level.

### 10. Dynamic Test on Simple Supported Beam

Sergio Gallardo and Sarah Xie-DeSoto

Dr. Weining Feng, Research Mentor, Department of Engineering Technology, UHD

**Abstract:** Structures have natural frequencies which may be determined using experimental or analytical methods. The first three natural frequencies of a simple supported beam are found using an experimental method and compared with the analytical result. The beam is made of aluminum with a hollow cross section of 1 inch, the span is 96 inches and the supports are type pin, permitting rotation and axial displacement. It can be appreciated that the experimental results agree with the theoretical results with a difference of 0.08% to finite model, 0.5% to the hand calculation for the first mode, 4.3% for the second mode, 3.6% to finite model, exact value to hand calculation. Therefore the experimental method used is acceptable.

### 11. Presence of Biofilms in Martian Simulant Soil

Elizabeth Garza and Claudia E. Mendez

Dr. Poonam Gulati, Research Mentor and Faculty Mentor, Department of Natural Sciences, UHD

Dr. Penny Morris-Smith, Research Mentor and Faculty Mentor, Department of Natural Sciences, UHD

Location: UHD and NASA Johnson Space Center

**Abstract:** JSC Mars-1 soil is used as a Martian simulant soil and it comes from Pu'uNene which is an island of Hawaii. This particular has a lot of physical and chemical characteristics as the actual Martian soil does for this reason this simulant soil is studied to get the feel for what might exist in Mars. The soil was used to investigate if organisms existed. The detection of organisms was observed by the presence of biofilms. Biofilms are communities of microorganisms and biofilms form on soil as well as many other places. Several assays were used to detect biofilms but a very successful method was the Colorimetric Measurement of Biofilm Density.

### 12. Lower Bounds on the Matching Number of Bipartite Graphs

Iride Gramajo

Dr. Ermelinda DeLaVina, Research Mentor, Department of Computer and Mathematical Sciences, UHD

**Abstract:** This presentation is a summary of an undergraduate research project in graph theory, which involved resolving lower bound conjectures on the matching number of bipartite graphs. One main objective of this project was to obtain a collection of lower bounds, which collectively predict the matching number of bipartite graphs. The conjectures resolved in this project were generated by a computer program called Graffiti.pc, which was designed by my project advisor, Dr. Ermelinda DeLaViña. We present a summary of the collection of lower bounds thus far obtained.

### 13. Combating Spam Through Proofs of Effort

Cyril Harris III

Dr. Ping Chen, Research Mentor, Department of Computer and Mathematical Sciences, UHD

**Abstract:** Spam is rapidly degrading the value of the Internet. Current methods to block spam are becoming less and less effective. Because of this several researchers from Microsoft Research proposed a new type of solution at Crypto 2003. To combat spam these researchers proposed that prices be accompanied with the act of sending email. These prices are easy to verify proofs of computational effort which would be hard to compute for the sender but easy to verify for the receiver.

### 14. Stabilization of Thiol/Acrylate Systems Using N-PAL

Hilda Hinojosa, Christopher Lopez, Colin Carandang, and Lucio Patino

Dr. Byron Christmas, Research Mentor, Center for Applied Polymer Science Research, UHD

**Abstract:** Using *tris*-nitroso-N-phenylhydroxylamine (N-PAL) as a free radical polymerization inhibitor, an investigation was conducted to characterize the shelf-life stability and relative reactivity of UV-polymerizable, thiol/acrylate-based formulations containing various concentrations of N-PAL. These formulations were characterized for their relative reactivity using differential photocalorimetry (DPC) techniques. The shelf-life stability data generated thus far indicate that N-PAL provides adequate stability without significantly reducing the relative reactivity of the formulations.

### 15. Novel Analysis of Gene Regulation at Multiple Foci

Chau Hoang and Ngan Ha

Dr. Akif Uzman, Research Mentor, Department of Natural Sciences, UHD

**Abstract:** Gene regulation plays an important role in the development of the central nervous system. To understand this developmental process we sought to compare the upstream regulatory regions (URR) of several neural-inducing and neural-patterning genes to identify DNA sequences that might coordinately regulate gene expression. We sought to isolate the URRs (from *noggin*, *chordin*, *follistatin*, and *fibroblast growth factor receptors* (FGFR) 1 and 4) using polymerase chain reactions with gene-specific primers and different arbitrary primers. Although these URRs have not been isolated, many interesting artifacts are reported here along with some new approaches to obtain URR's for these genes.

### 16. Diatoms as Indicators of Wetland Mitigation Success

David Lang

Dr. Brad Hoge, Research Mentor, Department of Natural Sciences, UHD

Location: UHD, Greens Bayou Wetlands Mitigation Bank, and Anahuac National Wildlife Refuge

**Abstract:** Diatoms were chosen to assess wetlands mitigation success in The Greens Bayou Wetlands Mitigation Bank, a project of The Harris County Flood Control District. Diatoms respond rapidly to environmental changes, thus diatom succession provides a good model of wetland mitigation success. Samples were collected from surface water and the first 10 centimeters of soil at the GBWMB and The Anahuac National Wildlife Refuge, a relatively undisturbed wetland comparable to those at the GBWMB. Results show statistically different assemblages at the GBWMB compared the ANWR. These results suggest the GBWMB, although planted with climax community plants, is still undergoing succession.

### 17. Vector Competence of Mosquito Species Responsible for Transmitting West Nile Virus (WNV)

Lesley Leggett and Poria Rafei

Dr. Jeffrey Flosi, Research Mentor, Department of Natural Sciences, UHD

**Abstract:** West Nile Virus is a mosquito-borne flavivirus that primarily infects birds but occasionally infects humans and horses. Mosquitoes that are responsible for transmitting WNV in Texas include *Culex quinquefasciatus* and *Aedes albopictus*. Laboratory and field studies were conducted to evaluate the vector competence of *Cx. quinquefasciatus* and *Aedes albopictus*. Mosquitoes were collected from known breeding sites using CDC light traps baited with CO<sub>2</sub>; dead birds were also tested for the presence of WNV. Five pools of mosquitoes and 3 birds were tested for the presence of WNV using the VecTest™ antigen panel assay. All 8 tests were negative.

### 18. Identification and rDNA Analysis of Rhizospheric Fungal Species of Coastal Prairie

Lesley Leggett

Dr. Phil Lyons, Research Mentor, Department of Natural Sciences, UHD

**Abstract:** The Coastal Prairie Research Project aims to study relationships between microbial soil communities and other environmental factors. Fungal species inhabiting grass rhizospheres profoundly affect the plant and influence the ecosystem as a whole. Traditional identification techniques and molecular methods were used to characterize rhizospheric fungal communities. Roots of 10 coastal prairie grasses were obtained from intact coastal prairie. Fungi were cultured from rhizospheres; approximately 40 species were identified based on conidial morphology. Ribosomal DNA (rDNA) was amplified using PCR and sequenced to establish a rDNA clonal library. These rDNA sequences were useful for identification and confirmation of isolated fungal species.

### 19. The Effects of Decreasing Average Acrylate Functionality on Thermomechanical Properties and Relative Reactivity of Polymerizable Systems – Part 2.

Teresa Martinez, Colin Carandang, Zehra Dirani, Brian Rodriguez, Christopher Lopez

Dr. Byron Christmas, Research Mentor, Center for Applied Polymer Science Research, UHD

**Abstract:** A study was conducted on different formulations composed of acrylate-based urethane oligomer (ALU-350 65%), isobornyl acrylate (IBOA), hexanediol diacrylate (HDODA), trimethylolpropane triacrylate (TMPTA) (total of 35%), and 1-hydroxycyclohexylphenyl ketone photoinitiator (2pph). This study determined the effects of changing the percentage of IBOA within the formulation from 0 to 35%, keeping HDODA and TMPTA constant. The effects were demonstrated in thermomechanical properties, determined by dynamic mechanical analysis and differential scanning calorimetry, and relative reactivity by differential photocalorimetry. Viscosity, MEK double rubs, and potassium permanganate stain tests were also conducted on the formulations. No profound effect occurred when changing the amounts of IBOA.

### 20. A Search to Identify the Cheater Genes in *Dictyostelium*

Sanu Mathew and Vedangi Sample

Dr. Akif Uzman, Faculty Mentor, Department of Natural Sciences, UHD

Dr. Gad Shaulsky, Research Mentor, Department of Molecular and Human Genetics, Baylor College of Medicine

**Abstract:** *Dictyostelium discoideum* is a unicellular organism, which is used to study the characteristics of mutated genes. In *D. discoideum* integrating Restriction Enzymes causes mutations in the gene. *D. discoideum* forms a stalk in response to harsh conditions. Mutated dominant genes also known as cheater genes make their way to the stalks and they are collected to go to the next generation. Colonies with mutations are allowed to grow for ten generations. At the end they were analyzed using cheater assays to characterize the dominant mutants.

### 21. Isolation and Identification of Microbial Life in JSC Mars-1 Simulant Soil Using Biochemical and Molecular Techniques

Claudia Mendez and Elizabeth Garza

Dr. Poonam Gulati, Research Mentor and Faculty Mentor, Department of Natural Sciences, UHD

Dr. Penny Morris-Smith, Research Mentor and Faculty Mentor, Department of Natural Sciences, UHD

**Abstract:** JSC Mars-1, a Mars simulant soil, is altered volcanic ash from Hawaii similar to the physical and chemical composition of Mars soil. The purpose for this research was to isolate and identify microbes from JSC Mars-1 utilizing culture, biochemical and molecular techniques. The identified organisms will serve as a baseline test for determining the efficiency of Mars mission instruments designed for detecting life. The results indicated that there were as many as ~15 *Bacillus* species. Other genera that were highly homologous included, *Clostridium* and *Swine manure bacterium*. Additional analyses are being conducted using the MicroLog System: Biolog and BBL Crystal Identification Systems in an effort to verify which species are present in JSC Mars-1.

### 22. Physical Characteristics of Cultivated versus Non-Cultivated Prairie Wetland Soils, Sheldon Lake State Park, Southeast Texas

Gina Miles

Dr. Eric C. Carson, Research Mentor, Geology Department, San Jacinto College North

**Abstract:** Sheldon Lake State Park has been cultivated for over fifty years, creating a mosaic of mixed usage cultivated farmland and deciduous forest parkland. To test the effects of land use on soils in the study area, sediment cores were collected from uncultivated and cultivated sites. Two cores were analyzed at 5-cm intervals for grain size distribution and total organic content. Grain size distributions are nearly identical in the two cores from the surface to 130 cm depth. Organic content varies between the two cores, with high organic content in the upper 25 cm of the non-cultivated core. These data suggest that while cultivation in the study area has reduced organic content near the surface, there has been little erosion of the A-horizon.

### 23. An Initial Assessment of *Xylella Fastidiosa* Strain Diversity in Texas Using 16s-23s rDNA Sequencing and Rep-PCR Fingerprinting

Kristi Montgomery

Dr. Lisa Morano, Research Mentor, Department of Natural Sciences, UHD

**Abstract:** Pierce's Disease causes irreversible damage to vineyards in Texas and significant profit loss to the Texas wine industry. The disease is caused by the xylem dwelling bacterium *Xylella fastidiosa* (X.f.) which aggregates and limits water passage in the plant's tissue (Purcell, 1993). A phylogenetic analysis of *Xylella fastidiosa* isolates taken from five regional Texas vineyards was made using 16s-23s rDNA sequencing and rep-PCR fingerprinting. Three major strain differences were observed between vegetation and grapevine samples and two distinct grape strains were differentiated.

### 24. Parallel Power

Khoi Huu Nguyen

Dr. Hong Lin, Research Mentor, Department of Computer and Mathematical Sciences, UHD

**Abstract:** The search for more computing power has daunted the technology world since the introduction of computers. Currently, the typical Von Neumann architecture of computers has directed us to increase processing power and throughput via increased transistors, addressing space, and physical memory. However, a more efficient way is through message-passing between multiple processors. The concept of message passing is to achieve parallelism through a function that explicitly transmits data from one process to another. Message-Passing Interface (MPI) is simply a "library" of functions that can be called from C/C++ and FORTRAN. This poster studies the construction and processing power of different clusters running MPI programs.

### 25. Cheating; Yes Unicellular Organisms Do It Too

Tek Williams and Vedangi Sample

Dr. Akif Uzman, Faculty Mentor, Department of Natural Sciences, UHD

Dr. Gad Shaulsky, Research Mentor, Department of Molecular and Human Genetics, Baylor College of Medicine

**Abstract:** Altruistic behavior is exhibited in *Dictyostelium* during reproduction. This form of group selection, also observed in higher organisms, ensures that genetic traits shared by a related group of individuals persist through subsequent generations via the sacrifice of some members. Certain mutations often become over-represented compared to other mutants. Mutants were created using restriction enzyme-mediated integration. Cultures containing different mutants were randomly mixed, then allowed to undergo 10 rounds of replication. Cultures were then characterized using cheating assays to screen for dominant mutants. *Dictyostelium* strain AX4 was used to compare the level of cheating. Swindling ones way into the spores ensures that your genetic make up will be directly passed on to the next generation.



## 5<sup>th</sup> Annual Graduate School and Internship Fair



### Acknowledgements

It is a pleasure to recognize the many individuals, organizations, and institutions supporting UHD students in their research endeavors. Supporters of this event include the National Science Foundation (0336612), U.S. Army Research Office (W911NF-04-1-0024), U.S. Department of Education (P120A020069), U.S. Office of Naval Research (N00014-99-1-0950), and the University of Houston-Downtown.

Many of our students conducted their research during summer internships in 2004 with institutions such as the Baylor College of Medicine SMART program, NASA summer internship programs, Research Experience for Undergraduates at Sam Houston State University, Rice Undergraduate Summer Program in Statistics, Ronald E. McNair Post-baccalaureate Achievement Program, Undergraduate Summer Research Program in Environmental Science and Ecology at University of Houston-Downtown, University of Texas Medical Branch Summer Undergraduate Research Program, and the UT-Houston Medical School Summer Research Program. Faculty and staff members of these and many other academic institutions, as well as personnel at industrial facilities, have done much to support and mentor our students. In addition, we thank the UHD faculty and staff who've worked tirelessly to support undergraduate research experiences as well as the administrators who've helped make this event a reality.