



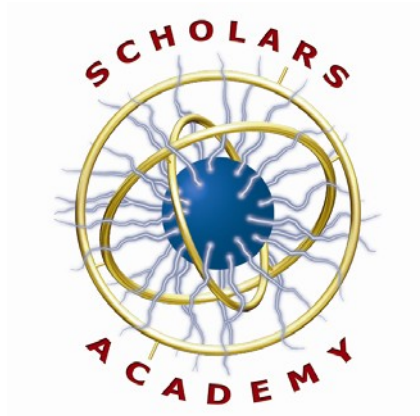
**University of Houston-Downtown**

# **Proceedings**

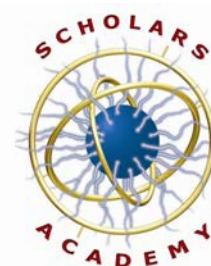
**5<sup>th</sup> Annual**

# **Student Research Conference**

**Sponsored by the UHD Scholars Academy  
College of Sciences and Technology**



**Friday, April 21, 2006  
Special Events Center**



We are pleased to present the proceedings of the 5<sup>th</sup> Annual Student Research Conference sponsored by the UHD Scholars Academy. We are proud to have made this conference a campus-wide collaboration from the Colleges of Business, Humanities and Social Science, Public Service, and Sciences and Technology. This year, we also had student participants from the National Conference on Leader Training and the Role of the Peer Leader. This complementary conference from the Peer-Led Team Learning Workshop Project is a national meeting on the methods applied to Peer-Led Team Learning (PLTL - [www.pltl.org](http://www.pltl.org)). The event, held on Friday, April 21, 2006, was well attended by over 350 individuals, including UHD faculty/students and representatives from area community colleges, graduate schools and research laboratories. An amazing total of 196 undergraduate authors and co-authors presented 101 papers in oral and poster presentations.

It is a pleasure to recognize the many individuals, organizations, and institutions supporting UHD students in their research endeavors. These include the National Science Foundation (0336612), the U.S. Army Research Office (W911NF-04-1-0024), the U.S. Department of Education (P120A050068), the Welch Foundation (BJ-0027), and UHD.

We greatly appreciate Drs. Byron Christmas, Lisa Morano, and Larry Spears, who are Principal Investigators for the above mentioned grants that generously fund this conference and the majority of on-campus research at UHD within the College of Sciences and Technology. Plus, we would like to thank UHD President Max Castillo for sponsoring the conference luncheon.

We are proud of the effort that these high-achieving students put into their research presentations, and we trust that each presenter found their experience challenging and rewarding. The research conducted by many of these students has served as a springboard for participation in local, regional and national conferences.

Many of our students conducted their research during summer internships at collaborating institutions, including Baylor College of Medicine, Hispanic Association of Colleges and Universities, NASA Johnson Space Center, Rice University, Sam Houston State University, Scripps Institution of Oceanography, the UHD SA Summer Undergraduate Research Program, University of Texas Medical Branch-Galveston, and the UT Health Science Center at Houston and at San Antonio. 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 have worked tirelessly to support undergraduate research experiences, as well as the SRC Planning Committee, and university administrators who have helped make this a successful event. We especially thank UHD President Max Castillo and Dean George Pincus of the College of Sciences and Technology.

Vicky Estrera, Ph.D.  
Director  
UHD Scholars Academy

The **UHD Scholars Academy (SA)** is an academically competitive program in the College of Sciences and Technology (CST) that promotes scholarship and student success for undergraduate students majoring in Science, Technology, Engineering and Mathematics (STEM).

One Main Street, 725-North; Houston TX 77002-1001  
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Sponsored by the UHD Scholars Academy  
Funded by the National Science Foundation (0336612), U.S. Army Research Office (W911NF-04-1-0024),  
U.S. Department of Education (P120A050068), and UHD.

**A showcase of academic excellence demonstrated by UHD students majoring within the  
Colleges of Business, Humanities & Social Science, and Sciences & Technology.**

**PROGRAM**  
**Friday, April 21, 2006**

- 8:00 - 9:00 am Registration and Continental Breakfast, Coffee House  
9:00 am *Dr. Vicky Estrera, Director, UHD Scholars Academy, Lecturer in Biology*  
Introductions, Auditorium  
9:00 am *Dr. Max Castillo, President, UHD*  
Welcoming Remarks, Auditorium  
9:10 - 9:45 am *Mr. Paul M. Frison, President and CEO*  
*Houston Technology Center, Houston, TX*  
Keynote Speaker, Auditorium  
9:45 - 11:00 am Oral Presentations, Session I, Auditorium  
11:10 - 12:25 am Oral Presentations, Session II, Auditorium  
12:25 - 2:00 pm Lunch break  
2:00 - 3:00 pm Open Poster Session I, Room A300  
3:00 - 4:00 pm Open Poster Session II, Room A300

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**Conference Organizing Committee**

**UHD Committee Chairperson:**

**Dr. Ermelinda DeLaVina**, Associate Professor of Mathematics, UHD  
**Dr. Darshan Wadhwa**, Professor of Finance, Accounting and CIS, UHD

**UHD Committee Members:**

**Dr. Richard Alo**, Executive Director, UHD Center for Computational Science, Professor of Mathematics  
**Dr. Byron Christmas**, Professor of Chemistry, UHD  
**Dr. Youn-Sha Chan**, Assistant Professor of Mathematics, UHD  
**Dr. Vicky Estrera**, Director, UHD Scholars Academy  
**Dr. Weining Feng**, Associate Professor of Engineering Technology, UHD  
**Mr. Rene Garcia**, Program Manager, UHD Scholars Academy  
**Dr. Aimee Kendall**, Lecturer of English, UHD  
**Dr. Marilyn McShane**, Professor of Criminal Justice and Director of the Institute for Community Justice, UHD  
**Dr. Lisa Morano**, Assistant Professor of Biology and Microbiology, UHD  
**Ms. Mitsue Nakamura**, Lecturer of Mathematics, UHD  
**Dr. George Pincus**, Dean, UHD College of Sciences and Technology  
**Dr. Herbert Rebhun**, Professor of Finance, Accounting and CIS, UHD  
**Ms. Anne Sherman**, Director, UHD Office of Sponsored Programs  
**Dr. Larry Spears**, Professor of Chemistry and Director of UHD Urban Center for Student Success in Science, Technology,  
Engineering and Mathematics  
**Dr. Edwin Tecarro**, Assistant Professor of Mathematics, UHD  
**Dr. Akif Uzman**, Chair of Natural Sciences Department, UHD  
**Ms. Celeste Zamora**, Media Relations Coordinator, Communications and Marketing, UHD

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## Keynote Speaker

Mr. Paul M. Frison, President and CEO, Houston Technology Center, Houston, TX.

### **Keynote Presentation Title:**

"An Investment in Houston's Future"

### **Keynote Biography:**

Paul is President and CEO of the Houston Technology Center (HTC), a business accelerator for Houston-based emerging technology companies. A non-profit corporation, HTC seeks to enhance Houston's position as a leading city for starting and growing companies in our city's key technology sectors: energy, information technology, life sciences and NASA-originated technologies.

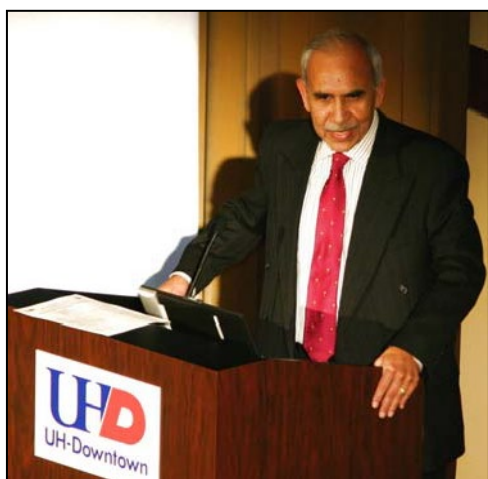
Paul has lived in Houston since 1975 during which he has been President and/or CEO of three public companies (LifeMark (1975 – 1984), NYSE; ComputerCraft (1984 – 1986), NASDAQ; LifeCell (1986 – 1999), NASDAQ), each technology based. He has been involved in five other start-ups by serving on the Board of Directors. His experience includes numerous mergers and acquisitions. He has raised multiple rounds of venture capital, two IPOs, and more than a dozen follow-on rounds of public financing. In 2004 he was honored by the Ernst & Young Entrepreneur of the year program and by the Kauffman Foundation for his achievements as Supporter of Entrepreneurship.

Paul received his B.A. from Occidental College in Los Angeles, California. He currently serves on the Board of Directors of the HTC, MicroMed Technology Inc., PharmaFrontiers, The Institute of Research and Rehabilitation (TIRR), The Entrepreneurship Institute, The Lions Eye Foundation – Houston, Boy Scouts of America – Houston, Texas Council of AEA, Texchange, The MIT Forum, and the Advisory Council of the University of Houston – College of Technology.



Mr. Paul Frison's headshot above. At right, Mr. Frison is pictured being greeted by Ms. Anne Sherman, UHD Director of Sponsored Programs, and Dr. Lisa Morano, UHD Assistant Professor of Biology and Microbiology, outside the UHD Wilhelmina Cullen Robertson Auditorium.

Shown below is UHD President, Dr. Max Castillo, opened the 2006 SRC, welcoming over 300 participants and guests and introducing the keynote speaker.



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## Oral Presentations



**James William Alexander**  
“The First Lady of American Politics - Abigail Adams”  
UHD Faculty Mentor: **Dr. Leta Schoen**  
Project Location: University of Houston-Downtown

By looking at her correspondence, this paper reveals Abigail Adams’s importance as an early feminist and discusses the sway she had over her husband, John, a Massachusetts Representative to the Colonial Congress. The history of the American Revolution abounds with great men like Thomas Jefferson, James Madison, George Washington, and Benjamin Franklin. However, an illumination of our founding influences is not complete without recounting the immense contribution of Mrs. Adams, an outspoken advocate for the rights of women in the newly forming republic. The letters between her and her husband provide ample evidence of her influence on the events and thinking of the time, including the composition of the Declaration of Independence. Abigail Adams captured the flavor of the time as well as putting her imprint on American thought through this correspondence.



**Clarisia Avila, Rita O'Malley, Don McConnell, David Cline, Yolanda Soriano**  
“Innocent Spouse Relief”  
UHD Faculty Mentor: **Dr. Darshan Wahdwa**  
Project Location: University of Houston-Downtown

An innocent spouse is someone who filed a joint return with their spouse and is being held accountable for an error or omission of income or deductions by their spouse which resulted in an understatement of tax. The innocent spouse must prove that at the time of the signing of the joint return he/she had no knowledge of or reason to know of the error or omission and it would be unfair to hold them accountable for the tax liability, penalties and interest. Three types of relief are available for this situation; innocent spouse relief, relief by separation of liabilities and equitable liability.



**Jerry Flores**  
“Change in Span of Control After 9/11: An Exploratory Study of Security Professionals”  
Co-Authors: **Dr. Hsoio-Ming Wang, Dept. of CJ, UHD; Greg H. Walker, Houston Airport System**  
UHD Faculty Mentor: **Dr. Chris Guarrero**  
Project Location: University of Houston-Downtown

Gulick’s *Theory of Organization* theorizes work division as the foundation of organization, and that span of control is affected by three factors: diversification of function, the factor of time, and the factor of space. Gulick believed based on these factors, and a departmentalization of organizational structure, a sufficient span of control could be reached, maximizing an organization’s production. However, of late, Hammer and Champy argue a *reengineering* of America’s corporations, integrating processes, reducing process administration overheads, and ultimately flattening the overall organization. Considering this span of control argument, where does the security industry stand, and what has been the impact of 9/11 on this issue? In order to shed some light on these questions, this study surveys security professionals in Houston, Texas, and provides a discussion on 9/11’s impact on span of control for this industry.

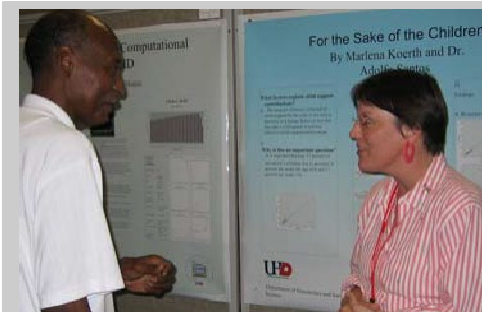


**Mario Garza and Nydia Cordero**  
“High Strength Concretes with Different Proportions of Cement and Fly-Ash”  
UHD Faculty Mentor: **Dr. Jorge Tito-Izquierdo**  
Project Location: University of Houston-Downtown

This paper describes the test series performed with high-strength concretes using different proportions of cement and fly-ash class F. The experiment is accomplished using four teams; the first one (control group) uses 100% cement and 0% fly-ash, the other three groups use 75% cement and 25% fly-ash, 50% cement and 50% fly-ash and 40% cement and 60% fly-ash, respectively. Different water/cementitious (w/c) ratios were used, producing concretes with compressive strengths between of 6,000 psi and 12,000 psi. Near 600 cylinders are used for this study. The concrete with fly-ash almost reach the same strength as the control group, but need more time, depending on the fly-ash content. Also, concretes with high content of fly ash produces less hydration heat than the control group. Additionally, concretes with fly-ash improve their workability, reducing the necessity of water and super-plasticizer in the mix; therefore, the amount of cementitious material also may be reduced.



The Windows Server 2003 operating system offers a feature called Terminal Service that is provided to users at client computers throughout a Local Area Network (LAN) as well as a Wide Area Network (WAN). Terminal Services let you deliver Windows-based applications, or the Windows desktop itself, to virtually any computing device. One of the biggest questions asked is, how secure are Terminal Services? Part of my project is to investigate, research, and test Windows terminal services. Thru this presentation, I will show how network administrators can insure a certain level of security when implementing Windows terminal services in their network environment.



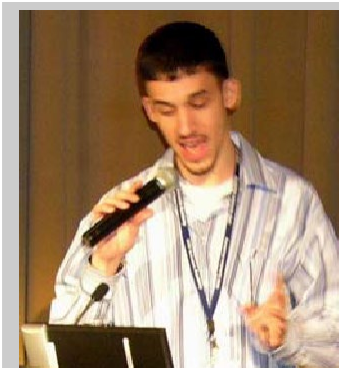
**Marlena Colleen Koerth**  
 "For the Sake of Our Children - Child Support Contributions in Dollar Amounts"  
 UH Faculty Mentor: **Dr. Adolfo Santos**  
 Project Location: University of Houston-Downtown

Children of divorce are more likely to live in poverty than those who reside with both parents. This project discusses what factors explain child support contributions. Ms. Koerth will conduct a literature review on this subject. She gathered data for the fifty states. It was gathered for one recent time point. Several independent variables were used to test several hypotheses. They included the following: income per capita, size in population, average age, and percentage of Catholic population. The dependent variable is child support contributions in dollar amounts. Prominent among these hypotheses will be the role of law enforcement on child support contributions. It is hypothesized that the amount of child support gathered by state's attorney general's offices is a function of the resources that the state contributes to insuring that child support is paid.



**Bjorn Larsen**  
 "Honda Fit Marketing Challenge"  
 Co-Authors: **Brendan McMullan, Eric Saville, Brittney Ballard, Stephen Browning, Sylvester Chung, Mikah Palermo, Leslie Rivas, Nicole Santos, Eric Soder, Ryan Wobbe**  
 UH Faculty Mentor: **Dr. Madeline Johnson**  
 Project Location: University of Houston-Downtown

Metro Marketing Agency proposes an integrated marketing campaign for the new Honda Fit on the University of Houston Downtown campus featuring the theme "Find Yourself. Find Your Fit." The objective is to create awareness of, familiarity with, and purchase consideration for the Honda Fit among the 18-25 year old Non-Conformists at UH. The integrated marketing campaign will include an event, *Experience Magic, Find Your Fit*, on April 11, and a web space, [myspace.com/hondafituhd](http://myspace.com/hondafituhd), and a series of advertisements and press releases that create interest in the Honda Fit. Our agency will manage a real \$2500 budget provided by Honda, conduct marketing research, design an IMC-focused campaign, make a presentation to a client (Honda and their agency, RPA), actually implement a campaign strategy, conduct post-event research, and develop a final report which details the implementation and results of the campaign designed to create awareness and interest in Honda's newest vehicle launch.



**Christopher Negron**

“Coordinators, a Key to Good Peer-Led Team Learning Management in a Large PLTL Program”

Faculty Mentor: **A.E. Drefuss**

Project Location: City College of New York

Presenter from the National PLTL Conference

The Workshop Coordinator, a trained, experienced peer leader, is taught to be one of the key ingredients to the success of the Peer-Led Team Learning (PLTL) program in the Chemistry department at the City College of New York (CCNY). PLTL is an educational model whose pedagogy is intended not only to enhance the understanding of learning, but also facilitate and foster the communication skills, cooperative attitudes, and teamwork experience that all workers need in today's workplace. This poster will discuss the role of the coordinator by examining the administrative, organizational, and learning aspects, as well as its benefits and disadvantages. The CCNY model is defined and discussed in view of how the Coordinator's role supports the Workshop program.



**Hunter Nguyen, Nguyen Lam, Vien Lam**

“UV Polymerizable Systems Containing Single-Walled Carbon Nanotubes”

UHD Faculty Mentor: **Dr. Byron Christmas**

Project Location: University of Houston-Downtown Center for Applied Polymer Science Research (CAPSR)

Studies were conducted to investigate the effects of single-walled carbon nanotubes on the rheological, thermal, and thermomechanical properties of UV-polymerizable formulations. The effect of SWNT concentration on the relative reactivity of the systems was also investigated. The acrylate-functional formulations contained an aliphatic acrylated urethane oligomer, three acrylate-functional monomers, and a photoinitiator. Initially, a method was developed for dispersing the SWNTs in the monomer/oligomer mixture. Then, formulations containing concentrations of SWNTs ranging from 0.00 pph to 0.20 pph were prepared by this method. Visible/Near Infrared spectroscopy experiments indicated that the SWNTs were well dispersed. Subsequent rheological studies corroborated this finding. The dispersions were evaluated for their relative reactivity using differential photocalorimetry. UV-polymerized films of these formulations were also evaluated for thermal and thermomechanical properties using differential scanning calorimetry and dynamic mechanical analysis techniques, respectively. Results indicate that UV-polymerizable SWNT-containing dispersions can be prepared using relatively simple dispersion methods.



**Mesias Pedroza**

“The Structure of Basidiomycete Communities on Root Rhizospheres of Native Coastal Prairie Grasses”

UHD Faculty Mentor: **Dr. Phil Lyons**

Project Location: University of Houston-Downtown

The objective of this research was to determine diversity among basidiomycetes in roots and root rhizospheres of three native coastal prairie grasses: *Setaria geniculata* (Knotroot Bristlegrass), *Tripsacum dactyloides* (Eastern Gamagrass), and *Spartina spartinae* (Gulf Cordgrass). Using molecular analysis of fungal ribosomal DNA (rDNA), we established a base line for root fungi of grasses in native prairie, which will be used for comparing the fungal progression on the same grasses in restored prairie. Thus, we can better understand the impact of habitat disruption on soil ecology. Identification of basidiomycetes in roots and rhizospheres was based on rDNA differences in the ITS1 and ITS2 spacer regions. More than 10 different operational taxonomic units (OTUs) from over 150 sequences were identified, some specific to the rhizosphere and some to the root. Most OTUs were common on roots of all three grasses; however, each grass also displayed exclusive OTUs.

Note: Above oral student speakers also presented a poster of their research within the Conference Poster Sessions.

## Poster Presentations

No photo available.

### Zaher Abdo

“Thermal Properties of Organic Compounds by Simultaneous Thermal Analysis & Mass Spectroscopy (TA/MS)”

UHD Faculty Mentor and Co-Author: **Dr. Janusz Grebowicz**

Project Location: University of Houston-Downtown

Thermal properties of bacterial Bio film (*Aerugiosa*) and amino acid (L-cystine) were studied by simultaneous Thermal Gravimetry Analysis (TGA), Differential Scanning Calorimetry (DSC) and Mass Spectroscopy (MS) with temperature ranges of room temp 20c° to above the temperature of decomposition of 500c°. (TGA) allows us to record a pattern of weight change as a function of temperature and quantitatively characterize it in terms of temperature transitions and percent of weight change. DCS gives thermal dynamic characterization of all physical process involved including evaporation, crystal melting and thermal decomposition. All chemical compound vaporizations from each sample where analyzed by the mass spectrometer. The STA skimmer system by NETZSCH was used for this experiment.



### Seyed Mohammad Abedi

“Thermal Properties of Volcanic Obsidian Rocks”

UHD Faculty Mentors: **Drs. Kenneth Johnson and Janusz Grebowicz**

Project Location: University of Houston-Downtown

Obsidian is volcanic glass; its ability to flow during volcanic eruptions is largely a function of the glass transition temperature ( $T_g$ ). This study is being conducted to determine the affects of chemical composition on the  $T_g$  in simple silicate systems. Synthetic obsidian are produced by fusing variable mixtures of  $\text{SiO}_2$ ,  $\text{Al}_2\text{O}_3$ ,  $\text{Fe}_2\text{O}_3$ ,  $\text{CaO}$ , and  $\text{Na}_2\text{O}$ , and then undercooling the molten liquid to form an amorphous solid. Lack of microcrystallinity in the  $\text{SiO}_2$ - $\text{Al}_2\text{O}_3$ - $\text{Fe}_2\text{O}_3$ - $\text{CaO}$ - $\text{Na}_2\text{O}$  glasses is verified using Laue x-ray diffraction, and their  $T_g$ s and heat capacities are measured by differential scanning calorimetry. These data can then be compared with those of natural obsidians analyzed by simultaneous thermal/ mass spectroscopy. The results allow us to determine the chemical compositional affects on the ability of obsidian magmas to flow upon eruption, and may explain why some obsidian eruptions were explosive, whereas others were not.

No photo available.

### Noor Ahmed, Kenneth Collins, Cynthia Kay Blanks, Shatori Dionne Harrison, Cristina Barillas, Leila Mamytbekova, Matthew William Kogler

“Disaster Relief: Real Time Integrated Assistance”

UHD Faculty Mentor: **Dr. Gary Stading**

Project Location: University of Houston-Downtown

The purpose of this UHD group project is to implement an integrated software system for non-profit and disaster relief organizations that will have the ability to assimilate existing data from various systems within a city, state or even nationwide in the event of a disaster. This new system will allow non-profit organizations and disaster relief programs to better manage their information, funds, and materials during real time disaster relief efforts. Organizations such as FEMA and American Red Cross can reference this research to help manage their supply chain in every aspect, to achieve the highest level of efficiency and effectiveness during emergencies.



### Betul Akin, Sean Hattenbach, Nadia Lera, Claudia Mendez

“Preliminary Investigation of Doxorubicin-Induced ROS Production”

UHD Faculty Mentor: **Dr. Jerry Johnson**

Project Location: University of Houston-Downtown

The mitochondrion is the site of oxidative phosphorylation in eukaryotic cells. Complexes I and III of the mitochondrial respiratory chain produce reactive oxygen species (ROS) as the byproduct of electron transport ATP production. ROS causes cellular damage under conditions of oxidative stress, despite antioxidant systems. In addition, ROS production can also be induced by chemotherapy drugs, such as Doxorubicin, that accumulate in the mitochondria. Specifically, doxorubicin has high affinity for cardiolipin, an acidic phospholipid of the inner mitochondrial membrane, which stabilizes the activity of respiratory chain protein complexes. It is hypothesized that doxorubicin accumulates and complexes with cardiolipin, causing mitochondrial ROS production and eventual cardiomyopathy. To investigate the site of ROS production and characterize ROS induction, we will isolate cauliflower mitochondria as a preliminary source and subject samples to doxorubicin and common respiratory inhibitors. Since cauliflower is inexpensive and readily available, it is used as an initial mitochondria model.





**Mohammad Alam, Jameel Eniafe, Ying Zi Ma, Bina Pise, Sumila Rehman, Adeela Yunus**

“Life Style Audit”

UHD Faculty Mentor: **Dr. Darshan Wahdwa**

Project Location: University of Houston-Downtown

An audit consists of an examination of compliance with applicable terms, laws, and regulations. Audits take place because of the differences of income reported on individual's tax return and the income reported to the Internal Revenue Services (IRS) by third parties. Financial status audit or life style audit is conducted to discover underreported and/or unreported income by individuals to the IRS. This audit generated inquiries about educational background, cash on hand, and cash hidden someplace in the home. IRS authorizes to conduct financial status audits and follow procedures that are authorized and approved by them.



**Memling Altamirano, Antonio Basilio, and Emily De La Garza**

“Identifying Hydrocarbon by Thermal Analysis of Limestone and Shale Rocks”

UHD Faculty Mentors and Co-Authors: **Drs. Janusz Grebowicz and Glenn Merrill**

Project Location: University of Houston-Downtown

Limestone and shale rocks from different locations were analyzed simultaneously by Thermogravimetry (TG), Differential Scanning Calorimetry (DSC), and Mass Spectrometry (MS) with temperatures ranging from 25-1200 ° C. The TG for all samples demonstrates two processes with major weight loss at approximately 100-350 ° C and at about 400-850 ° C. Both of these transitions are corroborated by DSC in form of endothermic peaks which suggest that they are due to evaporation. MS indicates that water is the main gas component released at low temperature transitions, while at high temperature transitions CO<sub>2</sub>, CH<sub>4</sub>, and C<sub>2</sub> were recorded. This is consistent with the hydrocarbon nature of the original source in the rock.



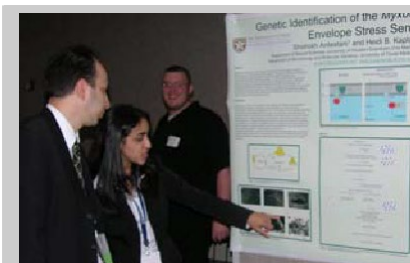
**Karla Alvarez**

“Using STELLA Software to Model Blood Glucose Levels in Response to Daily Meals and Exercise”

UHD Faculty Mentor: **Ms. Mitsue Nakamura**

Project Location: University of Houston-Downtown

The computer modeling program, STELLA, was chosen to develop a computer simulation of blood glucose levels, which constantly change throughout the day. The model is interactive and allows users (e.g., students) to study the effects of altered glucose metabolism, with the ultimate goal to allow users to study the dynamics of glucose metabolism in diabetics. In order to conduct this project a literature research was done on kinetic parameters of glucose metabolism. The major hormones responsible for oscillations in blood glucose levels are insulin and glucagons, which keep the glucose level between 90-100 mg/dl. Difference equations were tested based on known data of glucose tolerance tests to find the most accurate rate of blood glucose increase and decrease. The current STELLA model simulates normal blood glucose regulation and blood glucose changes after the consumption of 3 meals, 2 snacks, and 2 sessions of exercise and returns blood glucose levels to 90-100 mg/dl with kinetics similar to that observed in the literature.



**Shidrokh Ardestani**

“Genetic Identification of the *Myxococcus xanthus* Envelope Stress Sensor”

Co-Author: **Dr. Heidi B. Kaplan, Research Mentor, Department of Microbiology and Molecular Genetics, University of Texas Medical School at Houston**

Project Location: UT Medical School

*Myxococcus xanthus* is a Gram-negative soil bacterium that undergoes multicellular development upon starvation at high cell density. Expression of the early developmental gene *4445* that requires starvation and high cell density is regulated by the EcfA/ReaA/ReaB signal transduction system. A random genetic screen using the mini-Himar1 transposon was used to identify sensors that function upstream of this signal transduction pathway to sense input signals and transduce the information to the EcfA/ReaA/ReaB signaling pathway. Analysis of the sensors should identify the mechanism of signaling between the sensors and the EcfA/ReaA/ReaB signal transduction pathway that functions to integrate and transduce the envelope stress, starvation, and cell density cues during early *M. xanthus* development.



### **Ahlam Azam**

“Games as Collaborative/Cooperative Learning”

Co-Authors: **Brittany Vasquez**

Faculty Mentor: **Dr. James Becvar**

Project Location: University of Texas at El Paso

Presenter from the National PLTL Conference

At the recent SUN Conference ([sunconference.utep.edu/2006](http://sunconference.utep.edu/2006)) we presented a workshop detailing how several games (CHEMjeopardy, CHEMtaboo, and CHEMtwister) can be incorporated into the collaborative/cooperative learning aspects of PLTL Workshop. By using familiar games, students engage in active learning while staying within their comfort zone. Some students tend to lose interest in quantitative and conceptually challenging science classes. Difficult subjects become more approachable by presenting the topics in a competitive manner via games. Students are intellectually stimulated without realizing that they are learning. Games facilitate the building of fundamental correlations better than memorizing specific facts from a text. These games motivate students to think critically in a comfortable environment where students are more apt to acquire knowledge. Further, students work in teams, thus allowing them to help each other. Correlating chemical content to the rules and format of the games requires (develops) creativity on the part of the Peer Leader.



### **Ahlam Azam and Georgina Carballo**

“3 - 1 => 2 + 2 = MORE”

Faculty Mentor: **Dr. James Becvar**

Project Location: University of Texas at El Paso

Presenter from the National PLTL Conference

The format of the first semester general chemistry classes at UTEP changed in fall 2000 from the common three hours of lecture per week to the not so common two hours of lecture and two hours of mandatory small section workshop overseen by an undergraduate Peer Leader. CHEM 1305 PLTL Workshop has been fully integrated into the curriculum and impacts every STEM student at UTEP. Peer Leaders build learning communities and strengthen students understanding of chemical principles by spending about equal time in Workshop with 1) problem solving and 2) hands-on activities called Explorations. The main goal of PLTL Workshops is to improve student performance in the course. A secondary goal is to encourage students to consider the undergraduate major in chemistry. An unexpected, but significant, benefit of the workshops has been to increase the number of students who consider secondary teaching as a career.



### **Araly Barrera, Reyna Bonilla, Sara Jacobsen**

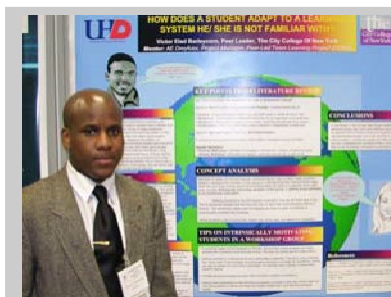
“Identity Testing”

Co-Author: **Olga Soto**

UHD Faculty Mentors: **V. Estrera, R. Garcia, M. Nakamura, L. Spears**

Project Location: University of Houston-Downtown

Saliva testing is a common forensic tool in attaining an effective and useful DNA (*Deoxyribonucleic acid*) sample. The purpose of this project was to investigate the method in which DNA is found within a person's saliva and the difference between similar alternative methods of saliva and blood testing. Our research found that the first phase in retrieving a DNA molecule lies inside an epithelial cell of a collected saliva sample. When compared to blood testing, we found that both saliva and blood testing methods carry the same results and accuracy rate when finding genetic information.



### **Victor Elad Barleycorn**

“How Can a Student Adapt to a Learning System That He/She is Not Familiar With?”

Faculty Mentor: **A.E. Drefuss**

Project Location: City College of New York

Presenter from the National PLTL Conference

Teaching styles and traditions vary according to institution and region. There are times when a student has to transfer from one learning institution to another. Some of these transferred students have a hard time adapting to the teaching system in their new college. However, with help from peers, good student-teacher relations with professors, adapting is facilitated. As experience has shown, we see that workshop leaders serve as proof that a student can succeed in a course, and obtain good grades. Hence, by examining the support provided by workshops, using motivation theory as well as developmental theory; through rallying students to work together in groups to solve problems and further understand a subject better, workshop leaders have a role to play in the “student - life” of the members in their group, and can hence help a student adapt to the system of learning that is required.

No photo available.

**Julie K. Bartley, Sharmistha Basu-Dutt\*, Rebecca Dodge, Victoria J. Geisler\*, Javier E. Hasbun, Michele Joyner, G. Richard Larkin, Deborah Lea-Fox, , Dusty Otwell, Muhammad Rahman, Karen H. Smith, John H. Storer, S. Swamy-Mruthinti**

“Generating Enthusiasm for Math and Science at University of West Georgia”

Faculty Mentor: **Dr. Victoria Geisler**

Project Location: University of West Georgia

Presenter from the National PLTL Conference

The Internal Revenue Service tax code has established a general statute of limitation of three years for the investigation and prosecution of individual income tax related offenses. This paper will examine what triggers the start of the statute of limitations, what the exception to the general rules are, and what can extend the statute on an individual case basis. The exceptions to this rule, as stated by the IRS which are examined here are: not filing a return, filing a fraudulent return, and the understatement of income by more than twenty-five percent. There are also circumstance which can extend the general 3 year rule such as fraud, conspiracy, and tax evasion. These statutes and various related court cases will be examined.



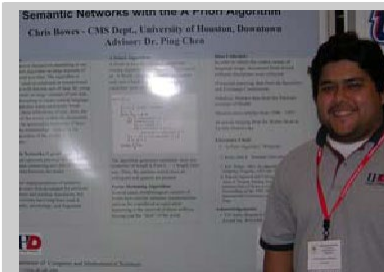
**Flor Benitez, Cindy Blanks, Tiffany Carter, Myrtle Fondal, Beatriz Ortiz-Calderon, Margarita Salazar**

“An Academic Strategic Alignment: The Credibility of Organizations, Leaders and Employees”

UHD Faculty Mentor: **Dr. Chynette Nealy**

Project Location: University of Houston-Downtown

Knowledge management is a strategic tool for organizations' credibility. A recent survey regarding corporate credibility conducted by Towers Perrin, a global management-consulting firm, cites that American workers are increasingly suspicious of information received within organizations. Recent business reports reflect a continuing pattern of unethical practices within organizations by upper management and employees. Subsequently, laws such as the Sarbanes –Oxley's Act are utilized to circumvent future questionable business behaviors and processes in the workplace. Aware of these social issues, business programs develop management practices focusing on credibility as well as creating an awareness of corporate and social responsibility for future business leaders and employees.



**Christopher Bowes**

“Building a Semantic Network with a Peiori Algorithm”

UHD Faculty Mentor: **Dr. Ping Chen**

Project Location: University of Houston-Downtown

This project focused on attempting to use the a priori algorithm on large amounts of unstructured text data. The algorithm is normally used on relational or transactional databases with discrete sets of data. By using this approach on large volumes of text data, we are attempting to create natural language English phrases using commonly found words in these collections of text. Also, the position of the words within the documents will also be analyzed to determine if there can be any relationships formed by the relative position of the words in the documents. Semantic Networks have many uses namely in the fields of machine translation and artificial intelligence.



**Myrna Ivone Calderon, “Purposeful Mistakes Enhance Peer Led Learning”**

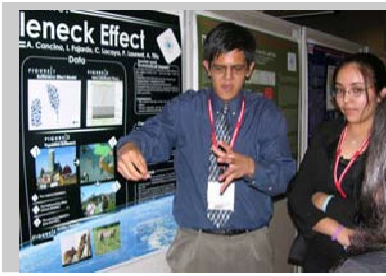
Co-Authors: **Hugo Alarcón V. and Rafael Ordoñez**

Faculty Mentor: **Dr. James Becvar**

Project Location: University of Texas at El Paso

Presenter from the National PLTL Conference

When the PLTL facilitator mixes purposeful mistakes within the context of the learning session, students are prompted to argue and analyze the information given in relation to their previous knowledge base. This is a good technique for stimulating debates among student teams and is a valuable scenario for promoting discovery learning. Group discussion of the purposeful mistakes leads to analytical minds and critical thinkers. A presentation with this same title was recently given as a fifty minute workshop at the UTEP SUN Conference (sunconference.utep.edu/2006). Participants encountered whiteboards in a Gallery Walk activity which included incorrect statements within problems. The job of the “student” (participant) was to spot these mistakes and correct them before traveling to the next board. At a final station a “Naughty Bad Breath Indicator” hands-on Exploration did not behave in the “right” way. Participants had to discover a chemical explanation for the “mis”behavior in this case.



**Ambar Cancino, Iliana Fajardo, Carlos Lacayo, Phoebe Laurent, Antonio Tito**  
“The Bottleneck Effect: Who Would Survive?”  
Co-Author: **Karla Alvarez**  
UHD Faculty Mentors: **V. Estrera, R. Garcia, M. Nakamura, L. Spears**  
Project Location: University of Houston-Downtown

According to the movie *The Day After Tomorrow*, people vanished after a myriad of hurricanes, tornadoes and cyclones, but only some people managed to escape extermination. This movie reflects the real survival phenomena after a natural disaster decimates the majority of the population to a few numbers of individuals. As a result, genetic variation is reduced causing a genetic drift and bottleneck effect. We researched the state-of-the art literature for Bottleneck effect and attempted to answer the question of who survives a natural disaster and the effect for the proceeding generation for its ability to adapt and survive.



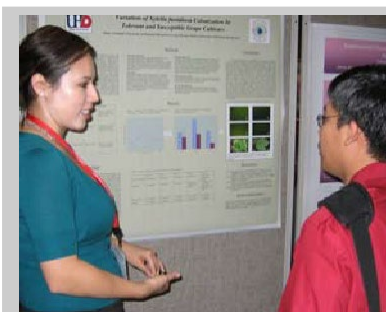
**Kimberly Ann Cantrell**  
“Population Density and Attractant Study of *Aedes albopictus* and *Aedes aegypti*,  
Arthropod-borne Virus Vectors, with Baited Mosquito Oviposition Traps in  
Observance of their 20 years in the Houston Area”  
UHD Faculty Mentor: **Dr. Jeff Flosi**  
Project Location: University of Houston-Downtown

Mosquito population densities change throughout the year correlating to the weather and dramatically affect the rate of transmission of arthropod-viruses. The *Aedes* species are said to have olfactory senses that are used to distinguish where they will deposit eggs, and it is found that they prefer near water containing high organic matter, making it stinky. Oviposition traps were placed at five different locations with a minimum of a mile difference and monitored for oviposition by *Aedes* species mosquitoes in order to get a good understanding of the upcoming mosquito population density and distribution for the year.

See photo above.

**Kimberly Ann Cantrell**  
“Chemistry and Potential Environmental Implications of Houston-area Waterways”  
Co-Authors: **Joel Henderson and Judith Vazquez**  
UHD Faculty Mentors: **Drs. Ken Johnson and Lisa Morano**  
Project Location: University of Houston-Downtown

Water samples from 11 Houston-area bayous, including the Houston Ship Channel, rainwater, tap water and well-water were collected for chemical analysis. Filtered samples were analyzed for dissolved metals by ICP-OES. Most trace element concentrations were below the EPA *primary* MCL, except some samples with slightly elevated Pb and Tl. Aluminum, Fe, and Mn, however, exceeded the *secondary* MCL (those that affect taste, color, and odor) in most samples. Total dissolved solids are also below the secondary MCL, but exceed the MCL near the Ship Channel, reflecting their marine influence. *E. coli* counts from the Buffalo and White Oak bayous, collected throughout Spring 2006, exceeded the EPA standard for recreational activities (>600-900 colonies/100 mL in both bayous), but do not correlate with trace element concentrations (e.g., P and K). This indicates that, at least for these bayous, trace elements are probably not useful as proxies for microbe activity.



**Dulce Carbajal**  
“Variation of *Xylella fastidiosa* Colonization In Tolerant and Susceptible Grape  
Cultivars”  
UHD Faculty Mentor: **Dr. Lisa Morano**  
Project Location: University of Houston-Downtown

Pierce’s disease in grapevines is caused by *Xylella fastidiosa*, a gram-negative bacterium that invades a plant’s water conducting vessels leading to severe water stress. This study investigated whether bacterial colonization levels were responsible for differences in disease susceptibility. Three grape cultivars, Cabernet Sauvignon, Chardonnay and Blanc du Bois, were inoculated with isolates of *X. fastidiosa* and monitored using ELISA and immunofluorescence to measure bacterial levels. We expected Chardonnay to have the highest bacterial levels due to observations where this cultivar dies most quickly in vineyards followed by Cabernet Sauvignon and Blanc du Bois. After an eighteen-week period, results showed bacterial colonization levels were highest in Blanc du Bois, followed by Chardonnay and Cabernet Sauvignon. Furthermore, Chardonnay developed symptoms earliest, followed by Cabernet Sauvignon and Blanc du Bois. Our results indicate that the ability of a hybrid to harbor *X. fastidiosa* does not affect susceptibility to Pierce’s disease. We are currently investigating differences xylem anatomy as a mechanism for tolerance to *X. fastidiosa*.



**Georgina Carballo**

“Supermarket Chemistry: Investigating Chemistry Using Household Materials”

Co-Authors: **Eunice Rascon, Dr. James Becvar**

Faculty Mentor: **Dr. James Becvar**

Project Location: University of Texas at El Paso

Presenter from the National PLTL Conference

A weekly two-hour PLTL Workshop was integrated within the curriculum of the general chemistry course at the University of Texas at El Paso beginning in fall 2000. In this Peer-Led Workshop, one hour is spent solving problems covering the concepts seen in lecture using collaborative team learning activities leading to critical thinking. The second hour is spent doing hands on activities that also develop critical thinking skills. Chemistry is everywhere! Relating what you learn in class to common, everyday materials helps to make scientific principles more relevant and personalizes the learning process. The hands on activities at UTEP are collectively called Explorations. Most of these Explorations involve common supplies and materials bought at supermarkets and local stores such as plastic cups, baking soda, purple cabbage, washing soda, dry ice, bubble soap and lye.



**Michael Carolan**

“*Xylella fastidiosa* Detection in Potatoes Exhibiting Symptoms of Zebra Chip Disease”

UHD Faculty Mentor: **Dr. Lisa Morano**

Project Location: University of Houston-Downtown

The primary goal for this research is to extract, culture, and identify the organism responsible for causing Zebra Chip (ZC), a disease responsible for over 5 million dollars of crop losses in Frito-Lay’s potato chip industry. Preliminary data from of North Dakota implicated *Xylella fastidiosa* (Xf) as the possible pathogen of ZC, but Xf had never been isolated from potatoes. A novel extraction and culture method was developed using ZC-infected potatoes from a Texas field. Sequencing of microbes from ZC potatoes implicated Xf as the possible pathogen. An initial inoculation of clean potatoes with the pathogen multiplex resulted in extreme disease symptoms. We have isolated individual Xf strains and have begun sequencing the gyrB gene for comparison to other known Xf strains. It is our belief that at least one Xf strain is a novel strain and we are performing Koch’s postulates to verify Xf as the causative agent of ZC.



**Stephanie Chadwick**

“Synthesis of Opposites in Early Works by Eugène Delacroix”

UHD Faculty Mentor: **Dr. Susan Baker**

Project Location: University of Houston-Downtown

This project is an examination of the mingling of classical and romantic themes and formal elements in the early history paintings of the enigmatic nineteenth-century French artist Eugène Delacroix. Formal analysis of Delacroix’s work is performed in relation to journal entries in which he grapples with reconciling a classical quest for order in the tradition of the French Academy of Fine Arts with a desire to capture the emerging romantic spirit. This poster session traces Delacroix’s gradual reconciliation of these tensions in *The Barque of Dante*, *The Massacres at Chios*, and *The Death of Sardanapalus* culminating in a kind of synthesis in his masterpiece *Liberty Leading the People*.



**David Cherian**

“Identification of Transcription Factor Sites Essential for Proper Expression of the *Ashwin* gene in *Xenopus*”

UHD Faculty Mentor: **Dr. Akif Uzman**

Project Location: University of Houston-Downtown

The *Ashwin* gene regulates early neural patterning in *Xenopus laevis*. The goal of this study is to identify regulatory transcriptional factors and determine their role in regulating *ashwin*. To identify these transcription factor sites a section of the upstream regulatory region (URR) was amplified and cloned from *X. tropicalis*. The primary objective was to construct a plasmid containing the URR that could then be injected into the embryos and monitored for correct gene expression in *X. laevis*. Amplification of the prospective URR utilized reverse primers within the *ashwin* coding region and a forward primer in the 1300 bp upstream area. The amplified DNA was cloned into a TOPO vector (Invitrogen). The insert from isolated colonies of transformed *E. coli* was amplified for sequencing. Sequencing results verified that the desired DNA sequence was present. The insert is now being transferred into a luciferase reporter plasmid for microinjection experiments into *X. laevis*.



**Grantley Christie**

“Exploring Differential Global Position Systems”

UHD Faculty Mentor: **Dr. Weining Feng**

Project Location: University of Houston-Downtown

The aim of the project is to study the system concepts and applications of the Global Positioning System (GPS) using land based differential error correction data to improve accuracy. Data were gathered on the installation, signaling methods, and communication of this system. This information was used to guide the online research process for information on the concept and operation of the Differential Global Positioning System (DGPS), and the applications of land based DGPS.

Field activities were conducted to collect the data necessary for this project. A DGPS receiver was used to: determine the position of the operator at surveyed positions in the Houston area, compare the accuracy of DGPS vs. GPS, and monitor the area of coverage of the signal from the Radio Beacon. A DGPS system will also be set-up at the University of Houston Downtown to demonstrate the operations of DGPS, and provide comparison with GPS.

No photo available.

**David Code**

“Nanotube/Glass Composition as New Material for Entrapping Electroactive Molecules”

UHD Faculty Mentors: **Drs. Mian Jiang and Larry Spears**

Project Location: University of Houston-Downtown

Sol-gel technique, in contrast to extremely high temperature adopted in manufacturing conventional ceramics and glass, offers a low or room temperature alternative for fabricating the ceramic material. Sol-gel process involves concurrently the hydrolysis and condensation reactions of molecular precursors such as metal alkoxides. This initially homogenized solution, known as sol, will gradually increase its viscosity as oligomeric and polymeric intermediates (designated as gel) form. Eventually a porous, usually nano-sized, glass or ceramic particles (xerogel) will be generated with or without well-defined crystalline structure. In this work, a new sol-gel glass / nanotube composite has been prepared. This facile fabrication incorporates carbon nanotubes into the Si-O glass network by dispersing them during sol phase and has subsequently improved the conductivity of the usual insulating glass. As a result, this nanotube / glass composite new material revealed entrapping capacity towards electroactive molecules that may result in further application in sensor fabrication.

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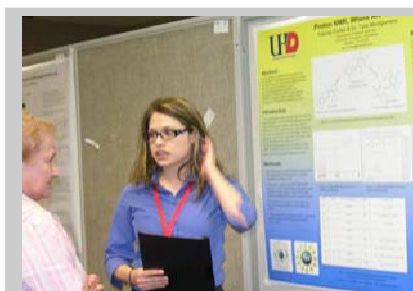
**Kenneth Collins**

“America’s Slipery Slope: A Systems Examination of the Economic and Political Consequences of Petroleum Dependency”

UHD Faculty Mentor: **Dr. Steven Maranville**

Project Location: University of Houston-Downtown

The United States operates in a global ecology with variables that act simultaneously and interrelatedly. These interrelationships put the U.S. in a precarious position, economically and politically. Changes in one variable will affect the functioning of all the variables in the system. For example, take the variable of demand for energy-related products. U.S. growth has stimulated oil dependency. Changes in the demand and supply of oil would affect other variables such as the value of the dollar, comparative advantage, balance of national powers, etc. The compounded effect of change in these interrelated variables results in economic and political consequences for the US. Framed by a systems perspective, this paper contains an examination of how the U.S.’s dependency on oil effects its economic growth and political strength? The examination reveals the “looming oil crisis” is not a threat but an opportunity through which economic and political innovations will be realized.



**Fabiola Cortez**

“Proton NMR, Where Are You?”

UHD Faculty Mentor and Co-Author: **Dr. Tyra Montgomery**

Project Location: University of Houston-Downtown

The original goal was to study the photo-induced and thermally activated tautomerization of 2-(2,4-dinitrobenzyl)pyridine NMR spectroscopy by dissolving 2-(2,4-dinitrobenzyl)pyridine in a solvent and determine which tautomer was responsible for the color change from brown sugar color to a blue jean color when exposed to UV light. In the process of gathering information for this project, it was determined that no solution NMR data for the compound of interest existed in the literature. The focus of the project quickly shifted to obtaining a proton NMR of the compound of interest, 2-(2,4-dinitrobenzyl)pyridine, and analyzing it.

No photo available.

**Ebrahim Dadabhoy, Daphne Green, Derek Harmon, Glen Kwan, Samir Muhammad, Caroline Mwanzia, Jiao Phan, "Civil Fraud Penalties"**  
UHD Faculty Mentor: **Dr. Darshan Wahdwa**  
Project Location: University of Houston-Downtown

This paper provides an overview of civil fraud penalties as well as defines and details the elements of civil fraud penalties. There are two classifications of tax penalties: civil and criminal. Civil fraud penalties are not considered to be a criminal punishment because it is primarily sought in order to compensate the government for harm done to it, rather than punish the wrongful conduct. Civil fraud penalties are assessed and collected administratively as a part of tax.



**Emily De La Garza**  
"Testing the Use of Adaptive Optics to Reveal the Age of Distant Galaxies"  
Co-Authors: **Dr. David Koo and Jason Melbourne**  
Faculty Mentor: **Dr. David Koo**  
Project Location: University of California, Santa Cruz

Until recently, high-resolution imaging studies of distant galaxies have had a missing critical wavelength, the near infrared. The infrared wavelength, compared to optical, is especially valuable because it is able to better penetrate dust and it is more sensitive to old stars. High resolution IR imaging is now possible with Adaptive Optics on large ground based telescopes. In this project, we have the benefit of adding high resolution IR imaging to already existing high-resolution imaging in the optical from the Hubble Space Telescope, for measuring stellar populations and their dust content. Simulated galaxy images spanning twelve different filters from the Ultraviolet to infrared are analyzed. Four sub-components were measured within the simulated galaxy and plotted against model spectra made with the Bruzaul and Charlot (2003) program. These spectra were made with a certain age, dust content, and strength of bursts in order to find the best fit for the regions measured in the simulated galaxy. From these graphs, an estimate of the age and dust content is made. We conclude that the ultraviolet filters are critical in producing accurate age measurements while the infrared filters are critical for dust content. The effects of Earth's atmosphere are added to the simulated IR image to see how well Adaptive Optics allows us to measure the ages and dust contents of the sub-components of the galaxy.



**Maria Elena Delavega and Bertha Martinez**  
"Coding Public Comments to the Proposed Rules on Intercountry Adoption"  
UHD Faculty Mentor: **Dr. Jo Bailey**  
Project Location: University of Houston-Downtown

The purpose of this presentation is to highlight the intricacies and pitfalls of the coding process for content analysis of textual data. The textual data consisted of the public comments to the proposed rules to the Intercountry Adoption Act of 2000, which the United States Senate passed in accordance with the Hague Convention on international adoption. This project showcases the codes upon which the research team agreed, and explains the process through which the team arrived at the selected codes, as well as the reasons for the selection of the specific codes.



**Mohamed Diarra**  
"Open Momo - An Open Source Project"  
UHD Faculty Mentor: **Dr. Ali Berrached**  
Project Location: University of Houston-Downtown

Game development is a very hard and expensive process. It requires a lot of work and money. Game developers are in need of different software to help them. My project is to help in that need by offering free tools that can be used for game development. Open Momo is an open source project designed to provide free plug-ins for applications such as 3D Studio Max and Maya. The first plug-in that I worked on is called Momo Exporter, which is designed to help programmers and artists export their 3D objects in XML text format for easy manipulation of the data. This allows game designers to visualize what their data will look like to the computer thus help them to make better game engines and 3D models. I have more information at the project's website at <http://openmomo.tiburongx.com>.



**Walter Dickson**  
 “Motivation by Nerds® and Airheads®”  
 Co-Author: **Jeffrey Hernandez**  
 Faculty Mentor: **Dr. James Becvar**  
 Project Location: University of Texas at El Paso  
 Presenter from the National PLTL Conference

PLTL Workshop is a required component of the first semester general chemistry course at UTEP. Motivating students to participate and to give more than one word answers in group discussions is sometimes difficult. Positive reinforcement is a key factor in getting students involved and interacting with one another. Here is a way that we have used to encourage them to do just that: reward them appropriately, and in a humorous way, for their work and effort. Those that answer correctly receive a small package of Nerds® and those who make an attempt (equals demonstrated effort), but are incorrect receive a package of Airheads®. (Watch out for those purposeful mistakes: Students seem to prefer Airheads®!)



**Jannie Marie Dilber**  
 “Investigation of the Thermal Properties of Bacterially-Produced Biopolymers”  
 Co-Author: **Martina Maier**  
 UHD Faculty Mentors: **Drs. Poonam Gulati, Byron Christmas, Janusz Grebowicz**  
 Project Location: University of Houston-Downtown Center for Applied Polymer Science Research (CAPSR)

Biofilms consist of intricate structures with organizations of microbial microcolonies adhering to each other by exopolymers. These exopolymers provide bacteria with protection against harsh and toxic conditions and a greater resistance to antibiotics. An investigation has been conducted to ascertain the composition and thermal properties of these bacterially-generated biopolymers, obtained by two different extraction methodologies. Infrared (IR) spectroscopy was utilized to obtain structural information about the biopolymers. Thermal gravimetric analysis (TGA) and differential scanning calorimetry (DSC) were used to evaluate the thermal characteristics of the biopolymers. Mass spectrometry was used to determine the composition of volatile components of the solid polymers and their thermal decomposition products. Results indicate that the biopolymers consist primarily of polysaccharides with small amounts of protein. Glass transitions (T<sub>g</sub>) and other thermal properties have been determined and are reported in this poster presentation.



**Josephine Dilber, Clarissa Fletcher, Amber Martinez, Shajeer Noorudeen, Reuben Rodriguez**  
 “How Will Intelligent Machines Affect Our Future?”  
 Co-Author: **Jonathon Keele**  
 UHD Faculty Mentors: **V. Estreza, R. Garcia, M. Nakamura, L. Spears**  
 Project Location: University of Houston-Downtown

While we are not quite to a technologically advanced stage such as presented in Steven Spielberg’s movie *A.I.*, scientists need to think ahead of the consequences this technology might have upon society. The advancement of technology prompts certain questions of ethics. For example, “Are there certain robots that shouldn’t be built?” Questions like these need to be thought of ahead in advance in order to avoid social disaster.

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**Daniel Dominquez**  
 “No Intelligence Left Behind: Stimulating Multiple Intelligences via Active Learning Techniques”  
 Faculty Mentor and Co-Author: **Drs. Juan Noveron**  
 Project Location: University of Texas at El Paso  
 Presenter from the National PLTL Conference

Human potential for learning is best realized when several intelligences are stimulated in individuals. When many people (e.g. in a class setting) undergo a common learning process, they best assimilate new concepts when information is provided via different delivery methods that address the multiple forms in which people learn. Here we discuss a set of active learning techniques previously reviewed at the recent SUN Conference ([www.sunconference.utep.edu](http://www.sunconference.utep.edu)). These examples consider how to approach the same ideas via different cognitive processes that address every intelligence. Peer-led team-learning provides an excellent framework to involve students in a rich learning environment which stimulates multiple intelligences.





**Adam Drake**

“On the Enumeration of a Class of Non-Graceful Graphs”

UHD Faculty Mentor: **Dr. Timothy Redl**

Project Location: University of Houston-Downtown

A simple graph  $G$  is a *graceful graph* if there exists a *graceful labeling* of the vertices of  $G$ . If we cannot gracefully label the vertices of  $G$ , then  $G$  is a *non-graceful graph*. A result by Rosa provides a sufficient condition for a graph to be non-graceful: "If a graph  $G$  is simple, even, and has  $e$  edges, with  $e$  congruent to 1 or 2 (mod 4), then  $G$  is not graceful." This condition implies an infinite subclass of non-graceful graphs, which we henceforth refer to as  $R$ . By the degree-sum formula for graphs, the sum of the degrees of  $G$  is equal to  $2e$ . We systematically enumerate graphs in  $R$  by first generating all even partitions of  $2e$  (where  $e$  is congruent to 1 or 2 (mod 4)) using Maple. These even partitions represent degree sequences of graphs with  $e$  edges. We then use the Havel-Hakimi procedure to determine which degree sequences are graphic. These graphic sequences determine all of the graphs in  $R$  (both connected and disconnected) with  $e$  edges.

Photo above.

**Adam Drake**

“Galactic Rotation Without Dark Matter Halos”

UHD Faculty Mentor: **Dr. Youn-Sha Chan**

Project Location: University of Houston-Downtown

Recently, Cooperstock and Tieu proposed a new model of galactic dynamics which relies solely on general relativity. The equations in this new model may solve the problem of galactic matter distribution and answer questions regarding the necessity of dark matter halos. We evaluate the Cooperstock-Tieu model to determine feasibility, specifically examining the dragging of inertial frames (Lense-Thirring effect).



**Carol Duncan, Patricia Jefferson, John Sanchez**

“Are Feminists Manhaters? Students' Attitudes Toward Feminists and Feminists' Attitudes Toward Men”

UHD Faculty Mentor: **Dr. Kristin Anderson**

Project Location: University of Houston-Downtown

A common stereotype exists that feminists are manhaters. However, no empirical studies have been conducted on feminists' actual attitudes toward men. UHD students ( $n=368$ ) responded to a survey that assessed: (1) their perceptions of feminists; and (2) feminist students' attitudes toward men. Contrary to popular belief, feminists and non-feminists did not differ statistically from each other. However, those who were “unsure” as to whether or not they are feminists had significantly higher levels of hostility toward men than feminists and non-feminists. Several significant effects associated with perceptions of feminists are presented as well. The results are framed in terms of theories of subtle prejudice.

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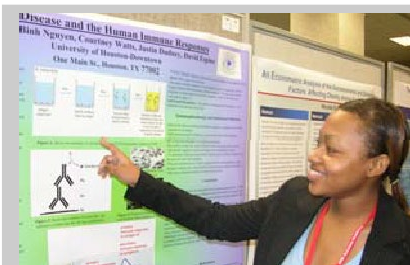
**Nicolas Esteban Endre**

“An Econometrical Analysis of the Socioeconomic and Demographic Factors Affecting Obesity Among Americans”

UHD Faculty Mentor: **Dr. Justo Manrique**

Project Location: University of Houston-Downtown

Obesity in the United States has increased significantly during the past two decades. According to recent estimates of the National Center for Health Statistics, 30 percent of American adults aged 20 years and older are obese and more than 9 million children and teenagers aged 6 to 19 are considered overweight. In this study, we use ordered probit regression analysis to examine the socioeconomic and demographic factors affecting obesity, paying special attention to the role of health knowledge and schooling as determinants of these diseases. The empirical results have showed that health knowledge and schooling decreases the probability of being obese and overweight. Other socioeconomic variables are also important determinants of the probability of being obese and overweight. The results of this study could be used to determine effective policies to prevent the expansion of these diseases among Americans.



**David Espino, Nguyen Lam, Binh Nguyen, Courtney Watts**

“Rubella Disease and the Human Immune Responses”

Co-Authors: **Justin Dudney, Moses Osoro**

UHD Faculty Mentors: **V. Estrera, R. Garcia, M. Nakamura, L. Spears**

Project Location: University of Houston-Downtown

*Rubella* is a highly contagious airborne virus that has an incubation period of fourteen to twenty-one days. Common names for *Rubella* are Epidemic Roseola, German measles, or Three-day measles. In 1954, Enders and Peebles isolated the virus in a human being and in a monkey's kidney. In the movie *Apollo 13*, Ken Mattingly tested positive for German measles and was taken off the mission. The method

that was used for testing Rubella in 1970 was indirect ELISA. Even though, he tested positive, he did not show symptoms by the sixth day. This prompted us to question the hypothesis: If a person tests positive, then he/she will develop the disease. The study examined the workings of the human immune system and various tests used to detect rubella. Based on the results, a person may test positive but have either a primary or secondary immune response. In the case of Mattingly, a subclinical infection may explain the absence of symptoms.



### **HyeJin Eum**

“Throwing Stones Into Water to Make Waves: The Benefits of PLTL Workshop”

Faculty Mentor: **A.E. Drefuss**

Project Location: City College of New York

Presenter from the National PLTL Conference

Peer-Led Team Learning workshops have several outcomes besides mastering the content of a course. This presentation will discuss these from the perspectives of both the peer leader and the students in the group. Rather than focusing on each student individually, as in tutoring, the leader works to create a learning team, where the students begin to help each other. Leaders also learn from each other during the weekly preparation session when they meet with their coordinator and faculty. Vygotsky's ideas of scaffolding is supported, as those who know more – whether in content or by ways of solving group dynamics – aid those less experienced, demonstrating the aid provided by a “more capable peer.” Benefits include improved learning skills as well as leadership and communication skills. These benefits should be used to recruit new leaders and students to peer-led workshops.



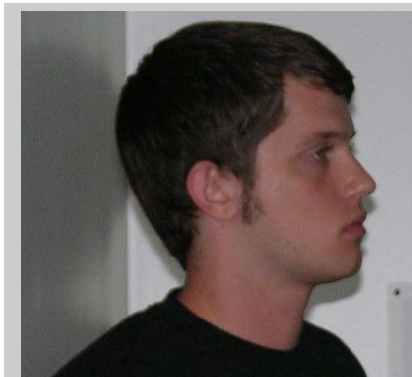
### **Thomas Craig Foster**

“On Leafy Spanning Trees of Graph”

UHD Faculty Mentor: **Dr. Ermelinda DeLaVina**

Project Location: University of Houston-Downtown

A subgraph of a graph that has the same number of vertices as the graph is a *spanning subgraph*. A connected *spanning subgraph* that has no cycle is a spanning tree of the graph. A *leaf* of a tree is a vertex of degree one. In general, computing the maximum number of leaves over all possible spanning trees of a graph, which we denote as  $L(G)$ , is known to be computationally difficult. The goal of this project is to find cases in which one can easily determine the maximum number of leaves among all spanning trees of a graph. Most of the results of this project originated as relations between  $L(G)$  and other graph invariants conjectured by the conjecture-making program, Graffiti.pc, created by Dr. DeLaVina. This project includes the resolution of several of Graffiti.pc's conjectures. The focus of this presentation is on results that involved  $L(G)$  and the neighborhood of the vertices of maximum degree of a graph.



### **Kyle Garmany**

“A Study of Diatom and Arcellacean Primary Communities for Measuring Succession in Mitigated Wetlands”

Co-Author: **Tek Williams**

UHD Faculty Mentor: **Dr. Brad Hoge**

Project Location: Green's Bayou Wetland Mitigation Bank, Anahuac National Wildlife Refuge, University of Houston-Downtown

Previous studies conducted in the Green's Bayou Wetland Mitigation Bank (GBWMB) have found diatom and arcellacean communities that differ significantly from those found at the Anahuac National Wildlife Refuge (ANWR). Determining arcellacean and diatom primary communities for GBWMB is essential for understanding the potential succession of this wetland. Core samples were collected from GBWMB and arcellacean and diatom diversity and abundance was measured throughout the soil profile. The abundance of these microorganisms greatly diminishes every centimeter down core, and were completely absent below the top three centimeters. The diversity of each assemblage resembles the biocoenosis. This suggests that the succession of the GBWMB is only at its earliest stages.



**Adewale Giwa and Juan Leon**

“Behavior of Cancer Cells in a Mathematical Model”

UHD Faculty Mentor: **Dr. Edwin Tecarro**

Project Location: University of Houston-Downtown

A system of ordinary differential equations is used to describe specific components of the mammalian cell cycle network. The system concentrates on seven different proteins which are known to be significant players in the development of cancer. We focus particularly on the effects of two tumor suppressor proteins –p21 and p53- on the cell cycle. We present simulation results which may provide insight into prospective biological studies of the cell cycle and cancer.



**Neri Gomez, Liem Luong, Arnulfo Maldonado, Robin May**

“How Accurate is the Portrayl of the Eboli Virus in the movie *Outbreak*?”

Co-Author: **Vien Lam**

UHD Faculty Mentors: **V. Estrera, R. Garcia, M. Nakamura, L. Spears**

Project Location: University of Houston-Downtown

Entertainment such as television and movies is notorious for not conveying facts accurately. Educated people often find watching movies as a waste of time. However, scientific and historical movies are usually researched and based on actual facts. So, watching movies can be educating as well as entertaining. Movies also update the general population on current and past events. The movie *Outbreak* was entertaining in addition to educating. Therefore, we want to investigate on how accurate the portrayal of scientific information is in the movie *Outbreak*. We hypothesize that most of the scientific information, maybe about 75%, is portrayed accurately.

No photo available.

**Kathryn Gutierrez, Michael Taylor, Rebecca Chitwood, Tony Jackson, Tammi Lott, Bob Fryer, Grace Anderson, Amy Vargas**

“The Statute of Limitations in Individual Federal Tax Matters”

UHD Faculty Mentor: **Dr. Darshan Wahdwa**

Project Location: University of Houston-Downtown

The Internal Revenue Service tax code has established a general statute of limitation of three years for the investigation and prosecution of individual income tax related offenses. This paper will examine what triggers the start of the statute of limitations, what the exception to the general rules are, and what can extend the statute on an individual case basis. The exceptions to this rule, as stated by the IRS which are examined here are: not filing a return, filing a fraudulent return, and the understatement of income by more than twenty-five percent. There are also circumstance which can extend the general 3 year rule such as fraud, conspiracy, and tax evasion. These statutes and various related court cases will be examined.



**Muhammad Hassan, “VoIP and Emerging PBX Technologies”**

UHD Faculty Mentor: **Dr. Ping Chen**

Project Location: University of Houston-Downtown

The project is an investigation of various VoIP protocols including SIP, H323, IAX and IAX2 and how they can be used to develop a robust, scalable, and reliable alternative to POTS (Plain Old Telephone Lines). We also look into available open source PBXs such as Asterisk and openPBX.

No photo available.

**Jeffrey Hernandez**

“Explorations: Teaching Students to Develop the Important Questions: “By Jove, the Whys (wise) have it!!””

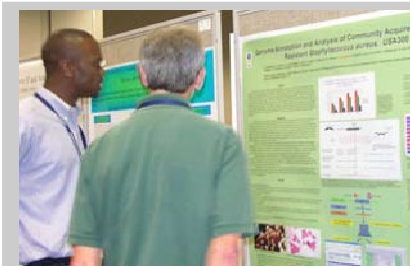
Co-Authors: **Marisa Galan, Myrna Calderon, Walter Dickson, Hugo Alarcon, Daniel Dominquez, Yoon Kim, Rafael Ordonez, Omar Khateeb, Albert Padilla, Lance Williams, Gina Carballo, Ahlam Azam, and Arturo Montes**

Faculty Mentor: **Dr. James Becvar**

Project Location: University of Texas at El Paso

Presenter from the National PLTL Conference

Chemical *Explorations* are short (30 to 45 minute), simple hands-on activities that expose students to relevant chemical processes that they cause to happen with their own hands. *Explorations* usually require no data taking nor data manipulation and are designed for students to feel, hear, smell and see chemistry in action and do not duplicate nor are intended to replace the usual “wet chemistry laboratory” which parallels most chemistry lecture courses. Students experience chemistry, then reach conclusions about the reactions taking place. *Explorations* offer a springboard for Peer Leaders to ask and to model the development of the Why? and How? Questions: the “Important” first step so necessary to critical thinking in chemistry. We will offer descriptions of several *Explorations* and discuss the associated “Whys” and “Hows”.



**Okezie Igboeli**

“Genome Annotation and Analysis of a Dominant Community Acquired Methicillin Resistant *Staphylococcus aureus*, USA300”

UHD Faculty Mentor: **Dr. Akif Uzman**

Project Location: University of Houston-Downtown

Community acquired methicillin-resistant *Staphylococcus aureus* (MRSA) is increasingly causing disease in the United States and elsewhere. USA300 has emerged as the predominant strain causing invasive infections in both adult and children with high mortality rates. The complete genome of USA300 (HOU) has been sequenced at the Baylor Human Genome Sequencing Center. Since most MRSA strains are nosocomial, there is a need to identify the specific genes responsible for the emergence of USA300 in the community as a highly stable, lethal and predominant strain. Genomic DNA from a USA300 isolate was sequenced using a whole genome shotgun approach. Coding sequences were predicted using GeneMark and Glimmer and deposited in the CONAN database for manual annotation using the GenBoree genome browser ([www.genboree.org](http://www.genboree.org)). A mobile genetic region encoding an arginine deiminase pathway, (absent in other *S. aureus* strains), was observed in USA300. This could contribute to growth and survival of the pathogen.



**Brian Neal Iken**

“Bald Cypress of the Texas Hill Country: Taxonomically Unique?”

Co-Author: **Yessenia Patino**

UHD Faculty Mentor: **Dr. Deanna McCullough**

Project Location: University of Houston-Downtown

Bald cypress (*Taxodium distichum*) found in the Texas Hill Country are thought to be different from members of the species outside of the Texas Hill Country. As reported in Texas Parks and Wildlife magazine, they usually have no knees, their shape is more spreading and less conical and their wood and bark show different patterns. This study of the Hill Country bald cypress attempts to determine if the trees are different enough to warrant a taxonomic designation as a different variety of *T. distichum*. DNA sequences of the chloroplast *rbcL* gene and portions of the rDNA gene, specifically of the two internal transcribed spacer regions were aligned using the ClustalX program and used to construct phylogenetic trees using the PAUP (version 4.0 beta) computer program. The resulting analysis of both gene samples does not support a new varietal designation for the Texas Hill Country bald cypress at this time.

No photo available.

**Adam Jordan**

“Landmark-driven, Atlas-based Segmentation of Mouse Brain Tissue Images with Gene Expression Data”

UHD Faculty Mentor: **Dr. Vasilis Zafiris**

Project Location: Univ. of Houston-Central and University of Houston-Downtown

In this project gene information is retrieved from images of the brain of a mouse at several developmental life stages. From each of these images we extract the amount of a specific gene that occupies each area of the brain by fitting a mesh against an image and then using that fitted mesh to extract the amount of certain genes within a specific area. Using this approach, the gene information can be extracted and calculated automatically without the need for human interaction. Moreover, based on assemblies of gene shapes, a 3D model of the mouse brain can be reconstructed. The gene information along with the 3D brain models can be used for medical research.



**Usman Khan**

“Deploying Multi-Agents in Grid”

UHD Faculty Mentor: **Dr. Hong Lin**

Project Location: University of Houston-Downtown

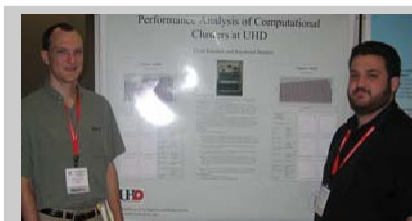
The project involves a new concept of how computing will be done in the future, especially when it comes to scientific community. As scientists and researchers do more and more sophisticated research and gather volumes of data, the need for super computers which can

analyze vast amounts of data will also need to be addressed. For this project we will implement a multi-agent system in grid. Multi-agent system is a software system which is composed of components or agents which can work together to achieve the overall task. There was a student, Sean Beard, who completed a simulation of a multi-agent system using MPI protocol. This project involves porting his program which simulates an email notification process in a distributed e-Learning system to run on the Grid and redoing the simulation with true parallel computing. This will result in software that can run in pieces on several computers on the grid to complete its computational intensive task in parallel and thus very quickly.



**Yoon Ju Kim**  
 “Countering the Know-It-All Disruptor”  
 Co-Author: **Dr. James Becvar**  
 Faculty Mentor: **Dr. James Becvar**  
 Project Location: University of Texas at El Paso  
 Presenter from the National PLTL Conference

Having been a learner rather than a teacher prior to becoming a Peer Leader, the first-time PL faces problems they never knew existed in classrooms, especially in learning to deal with students. It is devastating to classroom management and the flow of Workshops when the “scientific authority” of the PL is challenged by the “Know-It-All (K-I-A)” students who are very talented in sensing the nervousness of the first-timer PL. Since PLTL workshops are a required, integral part of the first semester general chemistry course at UTEP and students’ grades depend largely on participation, some of the students who resent being there are not bashful in challenging the authority of the PL. A successful strategy to counter this “loss of control” situation was used early this semester to change the K-I-A from challenger/competitor to collaborator/colleague and thus recover function in the workshop.



**Chad Kocurek and Raymond Mouton**  
 “Calculating the Power and Efficiency of Computation Clusters”  
 UHD Faculty Mentors: **Drs. Ongard Sirisaengtaksin and Hong Lin**  
 Project Location: University of Houston-Downtown

Using the High Performance Linux benchmarking software along with other tools, we have been conducting performance analysis of the two computational clusters located in UHD’s Grid Computing Lab. The analysis will include both computational and communication tests. With these results we will be able to optimize jobs, estimate time to completion of jobs, as well as further optimize the clusters for a greater rate of computation.



**Connie Larsson and Lisa Weigle**  
 “A PCR Strategy to Analyze *Ashwin* Gene Structure”  
 UHD Faculty Mentor: **Dr. Akif Uzman**  
 Project Location: University of Houston-Downtown

The promoter region of a gene contains specific transcription factor (TF) binding sites for regulated gene expression. *Ashwin* is a critical patterning gene in early *Xenopus* development, which is expressed in the dorsal ectoderm at the onset of gastrulation. We sought to isolate the promoter region of *ashwin* in *Xenopus laevis* and *X. tropicalis* to compare differences in TF utilization by these closely related species. We used PCR primers derived from the recently sequenced *X. tropicalis* genome to amplify 1-2 kb fragments of potential promoters. We failed to amplify this region consistently suggesting significant differences in base composition exist betwixt the genomes. To analyze this we will compare the differences between nucleotide sequences and their locations. We will also examine the variations of the third base in the codons to determine if they alter the amino acid sequence.

No photo available.

**Carlton Lewis, Melissa Navarro, Alberto Calvillo, Effream Pittman, Schrhonda Compton, Pearl Jacobs, Laura Webb**  
 “Criminal Tax Fraud Penalties”  
 UHD Faculty Mentor: **Dr. Darshan Wahdwa**  
 Project Location: University of Houston-Downtown

Criminal tax fraud penalties are penalties imposed when a taxpayer intentionally violates the tax law by avoiding paying the correct amount of tax due on his/her taxable income. The taxpayer can commit criminal tax fraud or tax evasion by failing to file a tax return, by filing a false return, and by failing to provide burden of proof of information given on the tax return. Anyone filing inaccurate information on a tax return to the IRS can lead to heavy penalties. These penalties can range from fines to imprisonment if prosecuted. In some cases, both fines and imprisonment are imposed on a taxpayer depending upon the conviction for failing to pay taxes according to the law and regulations according to the IRS tax code.

No photo available.

**Martina Maier, Moriam Ojelade, Jannie Dilber**

“Biofilm Formation, Extraction and Analysis of Exopolymeric Substances of Several Bacteria”

UHD Faculty Mentor: **Dr. Poonam Gulati**

Project Location: University of Houston-Downtown

Most bacteria and other microorganisms grow as biofilms in the environment. Biofilms consist of microcolonies of bacteria, exopolymers produced by the bacteria, and dispersed aqueous channels. The extracellular polymeric substances (EPS) are composed primarily of polysaccharides. Traces of nucleic acids, lipids, and proteins have also been identified in EPS. Most recent studies have focused on defining methods for synthesizing *in vitro* biofilms and studying their characteristics. There is a growing interest in studying the EPS itself devoid of bacteria. In this study, we have developed technologies for biofilm formation of various bacteria, for extraction of EPS, for testing the purity of the EPS and for analysis of EPS components. We have successfully grown biofilms of four different bacteria, *Staphylococcus aureus*, *Staphylococcus epidermidis*, *Pseudomonas aeruginosa*, and *Escherichia coli*, and are beginning to grow *Mycobacterium smegmatis*. Additionally, we have tested the purity of the EPS and have begun analysis of the EPS.



**Karim Masri**

“Growth, Isolation and Identification of Antibiotic Agents of *Trichoderma*”

UHD Faculty Mentors: **Drs. Tyra Montgomery and Phil Lyons**

Project Location: University of Houston-Downtown

The bacterium *Xylella fastidiosa* (Xf) is a Gram-negative xylem-limited plant pathogen which causes a variety of plant diseases including Pierce's disease (PD) of grape. Determining the genetic diversity of Xf strains in Texas is important to understand the ecology and epidemiology of disease spread. In order to evaluate genetic diversity in field-collected strains of Xf from grape and other hosts we sequenced a portion of 408 bp of the Gyrase B gene (GyrB) allowing us to categorize strains as grape or non-grape. Because the GyrB variability was insufficient for comprehensive assessment of genetic differences among Xf isolates, we further compared SSR (small subunit repeats) of the bacterial DNA. All isolates were found to have differences in their SSR sizes. This combination of methods will allow us to compare diversity of CA and TX strains and allow us to map the movement of Xf isolates if new vineyards are infected.



**Jordan McClinton, Nick Singh, Anh-Dung Nguyen, Nicolas Vega, Guilivaldo Villanueva, Carlos Gaitan-Cerda, Andy Davis, Josh Mason**

“Implementation of Real-Time Logistics Systems”

UHD Faculty Mentor: **Dr. Gary Stading**

Project Location: University of Houston-Downtown

The University of Houston-Downtown received a donation from HAL industries in the form of an application software program called C2C (conception to consumption). C2C software provides logistical and information system support necessary to manage the movement of goods and materials in real time. Currently the application is not operational at UHD at any level. Our group will undertake the implementation of the C2C software in order to achieve the following objectives: a) Layout the blueprint for making C2C software operational at UHD for educational-simulation and commercial purposes. The functional C2C software will be used to teach future students in supply chain management under different simulation scenarios; b) Conceptually link C2C software to SAP Enterprise software to improve the functionality of the management modules. SAP is not operational at UHD but the University faculty is considering the implementation of SAP campus wide for educational purposes.



**Lee Anne McGaha**

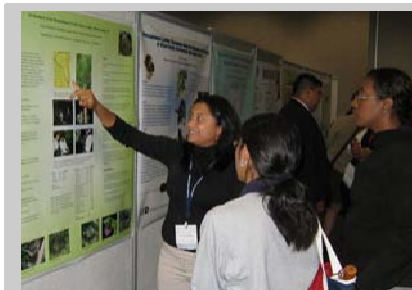
“Potential Plant Reservoirs for *Xylella Fastidiosa* in a Pierce's Disease Hot Zone”

UHD Faculty Mentor: **Dr. Lisa Morano**

Project Location: University of Houston-Downtown

*Xylella fastidiosa* is a Gram negative, xylem-limited bacteria and the causative agent of Pierce's Disease, a grapevine disease vectored by sharpshooter insects that results in the death of grapevines within two years. Pierce's Disease poses such a serious threat to the multi-billion dollar wine industry that over \$60 million has been invested by the state of California to fight the disease. Pierce's Disease is

becoming an increasing problem for the growing Texas wine industry. The goal of this project is to survey multiple species of native Texas plants for the presence of *X. fastidiosa* to determine which plants are serving as reservoirs of *X. fastidiosa*. Initial detection of *X. fastidiosa* was conducted using double-antibody sandwich ELISA, and *X. fastidiosa* positive plants were further tested using PCR to confirm ELISA results. Growers may use these findings to ensure that plant species known to harbor *X. fastidiosa* are not located in the vicinity of their vineyards.



**Paula Medrano**

“An Inventory of the Herpetofauna of Little Turkey Gulley, Harris County, TX”

Co-Authors: **Susanna Hooper and Karen Purpera**

UHD Faculty Mentor: **Dr. Aaron Krochmal**

Project Location: University of Houston-Downtown

Houston’s waterways are under assault from a suite of environmental stresses, including commercial and residential pollution, unchecked bacterial growth, and channelization. Monitoring urban water quality is integral to preserving the health and welfare of both the environment and the human population of Houston. Water quality can be assayed directly, by testing the chemistry and contents of the water, or indirectly, by surveying the biodiversity associated with the waterways. A reptile and amphibian biodiversity survey of Little Turkey Gulley, a tributary of White Oak Bayou, was conducted to evaluate the environmental quality of the area. The survey, conducted from May 2005 - April 2006, yielded 15 species of reptiles and amphibian living in the area. The results indicate the gulley is able to sustain a complex web on herpetofauna, a trait that is threatened by channelization of the waterways.



**Ruby Mendez**

“Percutaneous Lumbar Discectomy Using the Dekompressor™ Device in Virtual Reality Environment with Haptic Device”

UHD Faculty Mentor: **Dr. Ongard Sirisaengtaksin**

Project Location: University of Houston-Downtown

Percutaneous Lumbar Discectomy is a minimal invasive non-surgical option to treat back and leg pain. To perform this procedure, where a surgeon is forced to look away from his hands at a TV monitor, and many others in the large MIS market there’s obviously a need for training simulators. With the use of VR to this application surgeons can train for this area of work and get feedback of their performance for personal analysis and improvement. This work is done on the modeling of the Dekompressor™ Device with the use of 3D Studio Max software and its integration NASA’s Spinal Cord model. The user can interact with the models by the use of a haptic device for data input to a virtual environment created with the use of software, including: GHOST SDK, 3D Touch SDK, and Visual Studio C++. Feedback is given through graphic displays and haptic responses as well.



**Rim Mohamed**

“Data for Inequalities and Asymptotics for a Terminating  ${}_4F_3$  Series”

UHD Faculty Mentor: **Dr. Plamen Simeonov**

Project Location: University of Houston-Downtown

This presentation is a summary of an undergraduate research project in inequalities and asymptotics for a terminating  ${}_4F_3$  series. In this project, I give data confirmation of the special cases of a conjecture of Kresch and Tamvakis. I also have data that gives asymptotic estimates when the parameters in the  ${}_4F_3$  are large, and they confirm the same conjecture.

No photo available.

**Arturo Montes**

“You Can’t Do It for Them: Learning Takes Time”

Faculty Mentor and Co-Author: **Dr. James Becvar**

Project Location: University of Texas at El Paso

Presenter from the National PLTL Conference

Even with the widespread interest in pedagogical revision to enhance the learning process throughout K-16 education today, most deliverers (teachers, professors...) continue to fall back on lecture. The first semester general chemistry curriculum at UTEP (a three credit hour course) changed in fall 2000 to include Explorations: simple, descriptive hands-on activities. Participants at the recent SUN Conference ([sunconference.utep.edu/2006](http://sunconference.utep.edu/2006)) experienced the enhanced discovery opportunities enabled by

two examples of Explorations. Participants were first (re-)familiarized “The Cartesian Diver” and “Sinkers and Floaters”. Then these two density Explorations became a springboard to discuss and develop appropriate “why” and “how” questions for students at different levels as they progressed through expanded versions of these density activities a second time. Presenters posed sample questions and created alternative conditions for the “Divers”, “Sinkers”, and “Floaters” as necessary to stimulate active team discovery of a richer understanding of the important concept of density.



**Carol L. Morris**

“Characterization of the Physical Properties of Coastal Prairie Mima Mound Soils, Sheldon Lake State Park, Southeast Texas”

Faculty Mentor: **Dr. Eric Carson, San Jacinto College North**

Project Location: San Jacinto College North and University of Houston-Downtown

Mima mounds are enigmatic low, raised mounds no more than 1 m in height and roughly 10 m in diameter found in a range of geologic and geomorphic settings. This study evaluated mima mounds that occur on low-lying wetlands along the Gulf of Mexico coast in order to identify a hypothesis for their genesis. Seven 1-m cores spaced two meters apart were retrieved from across a mound at Sheldon Lake State Park in eastern Harris County, TX. Cores were sampled at 5-cm intervals; samples were analyzed for grain-size distribution, organic content, and carbonate content. The grain-size data show high proportions of sand in the uppermost ~25 cm of the mound. Combined with the organic and carbonate data, the data suggest that coastal prairie mima mound likely result from (fluvial?) sediment movement at the surface which enhances percolation of water from the surface following mound establishment.



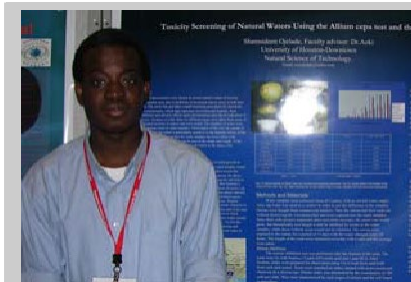
**Shajeer Noorudeen**

“Nanotube / Plastic Composite as New Material for Environmental Remedy”

UHD Faculty Mentors: **Drs. Mian Jiang and Larry Spears**

Project Location: University of Houston-Downtown

A new type of composite material based on the conducting polymer plastic embedded with nanotubes is reported in this presentation. Polypyrrole (Ppy) and carbon nanotubes were selected as model molecules for this purpose. Electro-oxidation is used to construct the composite in aqueous media. During oxidation of the pyrrole precursor, negatively charged nanotubes were incorporated into the organic polymeric Ppy network. The resultant nanotube/polymer plastic was found to be very stable in various media at wide pH range. For its potential application, we chose Hg (II) as model pollutant for remedy purpose. The composite material can extract and remove Hg (II) from industrial waste. The removed Hg (II) can be detected by using stripping voltammetry. The composite then can be regenerated afterwards by electrochemical modulation. Such “contaminant accumulation, extraction, detection, and composite regeneration” protocol can be expanded into other environmentally significant molecules.



**Shamsideen Ojelade**

“Toxicity Screening of National Waters Using the Allecum Cepa Test & Mitatic Inhibiting Test”

UHD Faculty Mentor: **Dr. Jon Aoki**

Project Location: University of Houston-Downtown

Allium cepa (onions) were chosen to screen natural waters of toxicity around the Houston area, due to problems of increased cancer cases in both men and women. The onion test provides a rapid screening procedure for chemicals, pollutants contaminants, which may represent environmental hazards. Root growth inhibition and adverse effects upon chromosomes provide an indication of likely toxicity. Samples of water from six different areas were taken from areas of highly evaluated increase in cancer and were tested. The samples of water were tested by exposing onion to water samples. Observation of the root tip system of the onion show that this plant is particularly sensitive to the harmful effects of the water samples. Results suggest that the water samples has been affect with contaminant from chemicals, which can be seen in the shape and length of the new root system and the inhibition in mitotic divisions in the onion cells.





**Kristi Pennington**

“Testing for Soil Variances in Texas Hill Country to Determine Cause of Altered Appearance of *Taxodium distichum* (Bald Cypress Trees)”

UHD Faculty Mentors: **Drs. Jon Aoki and Deanna McCullough**

Project Location: University of Houston-Downtown

In the Texas Hill Country, Bald Cypress Trees are very common however, a suspected different variety of Bald Cypress Trees have been observed. In a typical Bald Cypress tree, the branches form a narrower top to the tree and the bark is characterized by criss-cross type marks. The suspected variety of Bald Cypress has a broader top and deep vertical grooves within the bark. The objective of this project was to determine if there are any factors in the soil, which could contribute to the difference in the appearance of the trees. The substances that I tested for were pH, Nitrogen, Potassium, and Phosphorus. A lack of or an abundance of these substances may cause changes in the plant's physical appearance. The results indicated no significant difference in the levels of pH, Nitrogen, Potassium, and Phosphorus that could account for the degree of difference in the appearance of the trees. The future goals of the project include DNA mapping to ascertain whether there is a difference in the DNA at a genetic level. If there is a difference, we would like to determine if it is considerable enough to warrant the naming of a new variety of Ball Cypress trees.

No photo available.

**Erum Raja**

“Design and Investigation of Ru(II) *N*-Heterocyclic Complexes that Exhibit Proton Coupled Electron Transfer”

Co-Authors: **Michelle Logue and Dr. Spencer Slattery**

Faculty Mentors: **Drs. Spencer Slattery and Lucille Garmon**

Project Location: University of West Georgia

Presenter from the National PLTL Conference

The combination of proton and electron transfer processes, more commonly referred to as proton coupled electron transfer (PCET), continues to draw considerable attention due to its critical role in numerous biological processes, and its potential in the development of novel electronic, photonic, and catalytic materials. We have developed two novel tridentating ligands, each containing a single ionizable proton, for studying PCET. Both ligands, 6-(3-methylpyrazole)-2,2'-dipyridyl and 6-(benzimidazole)-2,2'-dipyridyl, were prepared from 6-methyl-2,2'-bipyridine. Each ligand (LH) was used to prepare the compound [Ru(LH)<sub>2</sub>](PF<sub>6</sub>)<sub>2</sub>. Cyclic voltammetry was used to characterize the redox behavior under protic (1:1 acetonitrile/water buffered solutions) solvent conditions in order to characterize the pH-dependence of the Ru(III/II) couple. The redox potentials as a function of pH were plotted where one-proton/one-electron transfer and a two-proton/one-electron transfer processes are observed. The synthesis of the ligands and the PCET behavior of the ruthenium complexes will be presented.

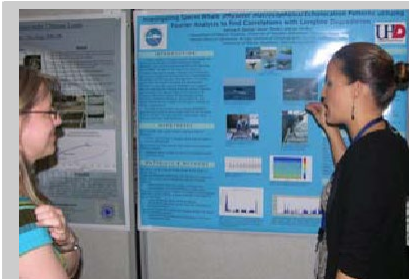


**Fabian Ramirez, Marvin Stephen, Gloria Matta-Aldana**, “Analysis and Design of Multiple Post Tensioned Cable Concrete Beam”

UHD Faculty Mentor: **Dr. Jorge Tito-Izquierdo**

Project Location: University of Houston-Downtown

The design process of various structures have been modified through time in order to provide higher safety levels for the general public. The research conducted demonstrates the advantages of Micro Silica Fume an essential additive for quick high strength concrete levels. Various software packages used to simulate the loading conditions that the beam will endure during the strength testing should be strongly related to the theoretical values calculated. Finally the service load testing should reflect higher performance strength than the non silica fume-single stranded post tensioned T-beam studied in the 2005 year.



**Patricia Azucena Ramon**

“The Use of Houston's Bayous as "Green Corridors" by ari Pavna”

UHD Faculty Mentor: **Dr. Aaron Krochmal**

Project Location: Little Turkey Gulley and White Oak Bayou, Harris County, TX and University of Houston-Downtown

Traditionally, the greater Houston area is home to a bounty of bird life and is a major center for annual avian migration. Extensive

urbanization of the area, however, limits both suitable habitats for and movements of resident and migratory birds. Houston's bayous, however, could serve as "green corridors" for the birds, narrow strips of hospitable habitat within a inhospitable matrix through which birds could pass. To determine if birds use bayous as "green corridors" the avifauna along Little Turkey Gulley, a tributary of White Oak Bayou, in Harris Co., TX. was surveyed from September 2005-April 2006. To date, over 60 species have been documented, including migratory shorebirds and passerine birds, as well as several indicator species. These findings demonstrate that Houston's urban waterways serve as green corridors for both local and migratory birds and indicate that land surrounding these waterways serve as suitable habitat for ecologically-important avian species.



**Juan Carlos Razo**

“Reevaluation of the Mimosa Species Previously Classified as Schrankia Based on the Internal Transcribed Spacers (ITS-1, ITS-2) of the nrRNA Gene”

UHD Faculty Mentor and Co-Author: **Dr. Deanna McCullough**

Project Location: University of Houston-Downtown

Mimosa is a major genus of the subfamily Mimosoideae (Fabaceae). North American representatives are in greatest abundance in Texas. Taxonomy of many species of Mimosa has changed repeatedly because of similarity of morphology. The genus Schrankia has been incorporated into the genus Mimosa, first as ! M. quadrivalvis with each member relegated to variety status; however, these members now have species status within the genus Mimosa. Using the ITS-1 and ITS-2 regions of the rDNA gene, DNA sequences have been obtained for the study of phylogenetic relatedness of various Mimosa species and former Schrankia members. This study attempts to answer questions concerning taxonomic designations and relationships within the Texas Mimosa. A phylogenetic tree has been constructed to answer taxonomic questions concerning the inclusion of Schrankia species into Mimosa and at what level.



**Brian Rodriguez**

“Stabilization of Thiol/Acrylate Systems Using N-PAL”

Co-Authors: **Hilda Hinojosa, Christopher Lopez, Colin Carandang, Lucio Patino, Dr. Byron Christmas**

UHD Faculty Mentor: **Dr. Byron Christmas**

Project Location: University of Houston-Downtown Center for Applied Polymer Science Research (CAPSR)

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 NPAL. 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.

Photo above.

**Brian Rodriguez**

“Stabilization of Thiol/Acrylate Systems Using N-PAL Part B: Systems Containing an Acrylated Urethane System”

Co-Authors: **Hilda Hinojosa, Dr. Byron Christmas**

UHD Faculty Mentor: **Dr. Byron Christmas**

Project Location: University of Houston-Downtown Center for Applied Polymer Science Research (CAPSR)

Using *tris*-nitroso-N-phenylhydroxylamine (N-PAL) as a free radical polymerization inhibitor, an investigation was conducted to characterize the shelf-life stability, relative reactivity, and thermomechanical properties of UV-polymerizable, thiol-acrylate based formulations containing varying concentrations of N-PAL and an acrylated urethane oligomer. These formulations were characterized for their relative reactivity using differential photocalorimetry (DPC) techniques, and Dynamic Mechanical Analysis (DMA) experiments were conducted to analyze the visco-elastic properties of their UV polymerized films. The shelf-life stability data generated from a previous investigation thus far indicate that at 5 ppm N-PAL provides adequate stability without significantly reducing the relative reactivity of the formulations. The formulations from this previous investigation contained isobornyl Acrylate (IBOA), a mono-functional monomer, as well as TMPTA and HDODA. It has now been concluded that IBOA serves as a possible chain stopper to the free radically initiated step-growth polymerization mechanism. This would result in lower crosslink densities for UV-cured films. Thus, for the first part of this experiment IBOA was removed and the concentration of N-PAL was varied. For the second part, an acrylated urethane oligomer was added and the experiment was repeated.

**Arbelia Roman and Shafeeq Noorudeen**

“Biofilm Formation of Staphylococcus aureus in vitro and Inhibition with Antibiotics”

No photo available.

UHD Faculty Mentor: **Dr. Poonam Gulati**  
Project Location: University of Houston-Downtown

In the presence of nutrients, water and a solid surface, microorganisms form biofilms, surface-attached communities of microorganisms made up of single or multiple species, formed through a coordinated chemical signaling process called quorum sensing. The microorganisms secrete extrapolymeric substances (EPS), which are composed of polysaccharides and some proteins, lipids and nucleic acids. The microbes are more resistant to harsh environmental conditions such as extreme temperatures and pH and antibiotics. Biofilms can also grow on medical devices, animal and human tissues, and resist conventional antibiotic therapy. The goal of our project is to study bone infections by the bacterium *Staphylococcus aureus*. We grew biofilms on a polystyrene surface and assayed them using crystal violet and ruthenium red dyes, as well as by scanning electron microscopy. We are beginning to test the inhibition of biofilm formation using different antibiotics. The biofilm formation and inhibition will then be tested in a rabbit model.



**Janeth Sanchez**, “The Effects of UV Energy Density on the Thermomechanical Properties of UV-Polymerizable, Thiol/Acrylate-Functional Systems Stabilized with NPAL”

Co-Author: **Brian Rodriguez**

UHD Faculty Mentor: **Dr. Byron Christmas**

Project Location: University of Houston-Downtown Center for Applied Polymer Science Research (CAPSR)

An investigation was conducted in the UHD Center for Applied Polymer Science Research to determine the effects of varying levels of UV energy density on the thermomechanical properties of UV-polymerizable, thiol/acrylate-functional systems stabilized with N-PAL®. UV energy density levels from 392 mJ/cm<sup>2</sup> to 1233 mJ/cm<sup>2</sup> were utilized and the thermal and thermomechanical properties of the polymer films were determined using differential scanning calorimetry (DSC) and dynamic mechanical analyses (DMA) techniques, respectively.

Photo below.

**Kevin Joseph Spring**

“Mosquito Species Composition and Infection Rate of West Nile and St. Louisencephalitis Virus in Two Above Ground and Two Storm Sewer Habitats”

UHD Faculty Mentor: **Dr. Jeff Flosi**

Project Location: University of Houston-Downtown

The purpose of this research is to determine the mosquito species composition and the infection rate of WNV and SLE in four different habitats, two above ground and two in storm sewers below ground. Although there was no significant difference between the frequencies of mosquito population, there was a significant difference in the diversity of mosquito species between above ground and storm sewer habitats in one of the properties studied. *Culex quinquefasciatus*, the main vector of WNV and SLE in Harris County, accounted for 56.32% of the total mosquitoes collected in storm sewers and 4.2% of the total mosquitoes collected above ground. This research shows that although there are no more mosquitoes in storm sewers than above ground, storm sewers do pose a habitable place for mosquitoes, especially those species most likely to transmit WNV and SLE in Harris County.



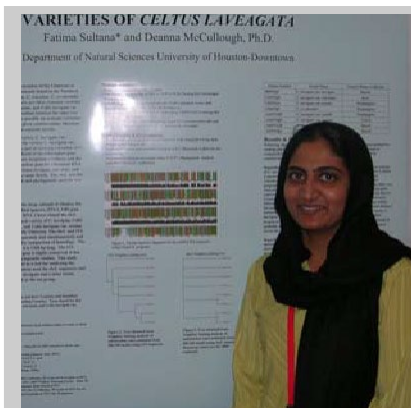
**Kevin Spring, William Watson, Hiba Zwiya**

“Electrochemical Detection Assay for Quantification of *Xylella fastidiosa* DNA after Polymerase Chain Reaction”

UHD Faculty Mentor: **Dr. Lisa Morano**

Project Location: University of Houston-Downtown

Pathogen detection by real-time polymerase chain reaction (RT-PCR) detects low concentration of DNA and allows for quantification of DNA. Unfortunately, RT-PCR machines are very expensive. Anzenbio, Inc. has developed an electrochemical detection (ECD) assay which can determine DNA concentration of PCR products by measuring electrical movement across the ECD chip. This enables the investigator to skip the use of an agarose gel for the detection and quantification of amplified DNA. The purpose of this experiment was to determine the rate of error with the Anzenbio ECD given known positive and negative PCR reactions of *Xylella fastidiosa* cultures. Preliminary analysis showed that the ECD can determine amplified *X. fastidiosa* DNA in a specific range of DNA concentrations. This technology also demonstrated that some *X. fastidiosa* PCR primers were forming primer dimers and giving false positive results. ECD technology has the potential to revolutionize PCR quantification with faster, accurate analysis.



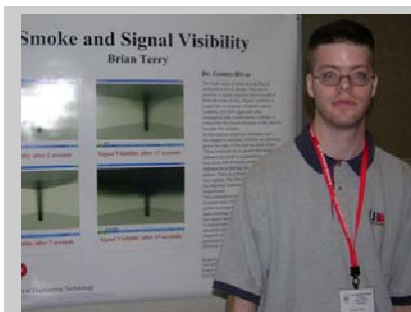
**Fatima Sultana**

“A Study of the Validity of the Taxonomic Varieties of *C. Lavaegata*”

UHD Faculty Mentor: **Dr. Deanna McCullough**

Project Location: University of Houston-Downtown

The genus *Celtis*, commonly known as sugarberry, is a member of the Ulmeceae or Elm family. Within *Celtis laevigata* there are three common varieties *Celtis laevigata* var. *laevigata*, *Celtis laevigata* var. *reticulata*, and *Celtis laevigata* var. *texana*. However, the variety *texana* often seems intermediate between the other two varieties and thus is difficult to place definitively and is possibly an ecotypic variation of *C. laevigata*, *laevigata* and if so, it should not be given varietal status. *C. laevigata* var. *reticulata* has been seen as a separate species by some. Our research objective was to determine whether the variety *reticulata* should be a separate species and to evaluate the variety *texana* with regard to its varietal status or whether it is just an ecotypic variation of *C. laevigata laevigata*. For this study we used the large subunit of the chloroplast gene (*rbcl*) which codes for ribulose biphosphate carboxylase oxygenase (rubisco), and the internal transcribed spacers, ITS-1 and ITS-2, of the nuclear gene for ribosomal RNA (*nrDNA*). Phylogenetic analysis was performed using the PAUP\* 4 phylogenetic analysis program.



**Brian Terry**

“Scientific Foundations of Fire Dynamics”

UHD Faculty Mentor: **Dr. Alberto Gomez-Rivas**

Project Location: University of Houston-Downtown

In pervious semesters we have study the ability of the Fire Dynamics Simulator, FDS, to predict the behavior of real fires in the laboratory comparing them with the results of FDS simulations. We concluded that FDS predicts in a satisfactory manner the characteristics of real fires. The objective of the research project is to see to what extent FDS allows for an insight into the connections between fire science, the overall behavior of fires, and the fundamental sciences: physics, chemistry, fluid mechanics and thermodynamics. The project is very useful for the Safety and Fire program at the Engineering Technology Department because it will help structuring the curriculum of the program. During the development of the project we plan to study for instance ethanol fires and their relation with the physical and chemical properties ethanol used as inputs for FDS simulations. It is important to observe that the conclusions will have significant consequences for the curriculum of fire science.



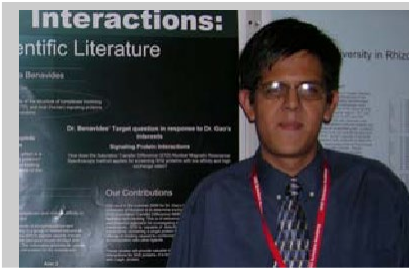
**Tatyana Teslova**, “The Answer Key: Promoting Students’ Failure - An Application of William Perry’s Scheme for Successful Learning”

Faculty Mentor: **A.E. Drefuss**

Project Location: City College of New York

Presenter from the National PLTL Conference

Students often hold the mistaken belief that the successful way to learn subjects is by memorizing consecutive steps in solving problems. Chemistry workshop peer-leaders approached famous psychologist William Perry’s learning to solve problems as a process emphasizing critical-thinking and problem-solving skills rather than as the accumulation of memorized information, facts, and theories. The experiment was based on elimination of the answer key to chemistry problems and encouraging students to make a personal commitment to obtain solutions by logical thinking. This method moved students from Perry’s dualistic views into a multiplistic stage where they recognized that knowledge is contextual and relative and all proposed solutions must be supported by reason, explained through discussion. William Perry’s Scheme works very well in peer-led workshops because, while each student develops his/her own “definition of problems” and works out his/her own solutions to problems, she/he is also able to compare solving methods to techniques that other students employ, and finds that other solutions may be even easier. Once the student learns to think about understanding the concept rather than memorizing problem-solving steps, his/her grades and persistence improve.



This literature review elucidates the molecular signaling protein association of *Helicobacter pylori's* (*Hp*) immunodominant CagA EPIYA peptide repeats to the SH2 human host protein. This study also attempts to reveal different aspects of intermolecular interactions of CagA-SH2 peptide/protein-protein complexes manipulating SH2 mutants and CagA peptide variants on Swiss Pro software. The research also presents the state-of-art technologies employed in Dr. Gao's Laboratory for this purpose. *Helicobacter pylori* (*Hp*) is a gram-negative spiral microaerophilic bacterium that lives in the stomachs of humans and animals under extreme acidic conditions. Its pathogenicity is associated with the formation of a pathogen island (PAI) by the bacterium colonizing the human stomach. Moreover, the infection is the major cause for peptic ulcers, and the chronic condition may lead to active gastritis, gastric MALT lymphoma, and gastric adenocarcinoma. Thus, the implications of understanding signaling protein interactions of the CagA-SH2 complexes serve for a greater biomedical importance.



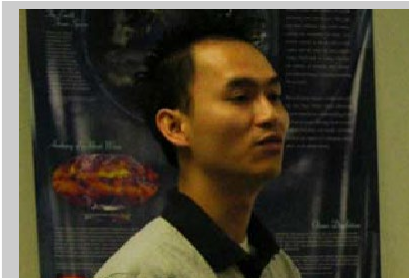
**Juan Pablo Tito**

“Fungal Diversity in Rhizospheres and Washed Roots of Coastal Tall Grass Prairie Grasses”

UHD Faculty Mentor: **Dr. Phil Lyons**

Project Location: University of Houston-Downtown

To obtain a greater appreciation of the fungal diversity in coastal tall grass prairie grasses, roots and root rhizospheres were analyzed using molecular analysis of the internal transcribed spacer region ITS 1 and ITS 2 of ribosomal DNA (rDNA), it is used a molecular approach. The molecular approach consists of determining the sequence of nucleotides to obtain an OTU that includes one or more samples. The grasses used were *Tripsacum dactyloides* and *Setaria Geniculata*. Alignments of the ITS1 and ITS2 sequences resulted in the identification of 6 different fungi from six sequences, referred to as operational taxonomic units (OTU's). Six OTU's with one sample for each OTU, were acknowledged being four of them from the unwashed root group and two from the washed group. The taxonomic group that most resemble the OTU's under study are the class Sordariomycete, the genus Entrophospora, the genus Candida, the species Omphalotus, the order Pleosporales, and the phylum Basidiomycota for OTU's I, II, III, IV, V, and VI respectively. The root rhizospheres of *Setaria geniculata* have the taxonomic group correspondent to the OTU's II, IV and V. The root of *Setaria geniculata* corresponds to the OTU III and VI. The root rhizosphere of *Tripsacum dactyloides* matches with OTU I.



**Hung Q. Tran**

“Infrared Sensing and Serial Communication”

UHD Faculty Mentor: **Dr. Weining Feng**

Project Location: University of Houston-Downtown

Infrared light beam can be use in many applications such as remote control, visual imaging (thermograph), and most of all, sensor. Many companies chose to produce theirs door sensors based on infrared light beam because it is cheap, accurate, and the range is far enough to cover the needed distance. For it to work properly; the system has two IR towers as sensory devices, which connect with a PC via serial communication ports. A software program will be developed that will record the time-stamped total counts and provide an operator interface. This project involves research work on both hardware as well as software.

No photo available.

**Jennifer Trejo**

“Mathematical Models for Projecting Growth”

UHD Faculty Mentor: **Dr. Youn-Sha Chan**

Project Location: University of Houston-Downtown

Several mathematical models are used to analyze real life data. Mathematical models include best-fit polynomials, exponential functions, logistic curves, and certain types of nonlinear "predator satiation" curves. The focus will be on how the mathematical models can have long-term prediction of the market growth. Data from business and industry will be collected and analyzed. Some parameters will be used in the mathematical models so that the models can be adjusted and improved for better predictions of the market growth.

No photo available.

**Borislava Tsanova, Marlin Mathews, Prince Buzombo, William Watson**

“Genetic Diversity of *Xylella fastidiosa* Strains in Texas”

UHD Faculty Mentor: **Dr. Lisa Morano**

Project Location: University of Houston-Downtown

The bacterium *Xylella fastidiosa* (Xf) is a Gram-negative xylem-limited plant pathogen which causes a variety of plant diseases including Pierce's disease (PD) of grape. Determining the genetic diversity of Xf strains in Texas is important to understand the ecology and epidemiology of disease spread. In order to evaluate genetic diversity in field-collected strains of Xf from grape and other hosts we sequenced a 408 bp portion of the *gyrase B* gene (*gyrB*) allowing us to categorize strains as grape or non-grape. Because the *gyrB* variability was insufficient for comprehensive assessment of genetic differences among Xf isolates, we further compared SSR (small subunit repeats) of the bacterial DNA. All isolates were found to have differences in their SSR sizes. This combination of methods will allow us to compare diversity of CA and TX strains and allow us to map the movement of Xf isolates if new vineyards are infected.

No photo available.



The objective of this project was to analyze the transition and stability of L-histidine by Simultaneous Thermal Analysis. Crystalline L-histidine was subjected to heating at a constant rate of 10 K/min in helium. Thermodynamic effects were measured by Differential Scanning Calorimetry (DSC). The melting temperature, measured by DSC, was close to the temperature of the major weight loss as measured by Thermogravimetric Analysis (TGA). The weight loss was caused by thermal decomposition of sample material followed by evaporation. The volatile matter was analyzed by Mass Spectrometry to identify its chemical composition.

Studies of gender typically utilize a single measure to assess gender roles, despite evidence that gender roles are comprised of orientation (e.g. "I am masculine"), norms (e.g., "men should be masculine") and stress (e.g., "I get upset if I act feminine"). This project examines the extent to which measures of gender roles are interrelated and to what extent ethnicity impacts the relationships among these measures. One-hundred male and female UHD students will be assessed for gender role orientation, norms, and stress, and negative affect (50 participants have completed the study). We hypothesize that gender role stress will be positively correlated with male role norms and negative affect. Exploratory analyses will test whether men and women of various ethnic groups report different levels of gender role orientation, norms, and stress. This study will help determine the extent to which ethnicity is important in understanding gender role issues.

No photo available.

**Dianne Wells, Wayne Wauters, Paige Gorman, Marcia Vanhorn, Michael Yost**  
"Substance Use and Intimate Partner Violence Among College Students"  
UHD Faculty Mentors: **Drs. Todd Moore and Deborah Rhatigan**  
Project Location: University of Houston-Downtown

Substance use and intimate partner violence (IPV) are highly prevalent across our colleges and universities. This project aims to examine the link between substance use and IPV among dating partners. One-hundred male and female social science students at UHD will complete a questionnaire packet that assesses alcohol use, drug use, relationship satisfaction, and violence perpetration and victimization in their intimate relationships (To date, 50 participants have completed the study). Consistent with prior studies, we hypothesize that men and women will report similar levels of IPV perpetration and victimization. We also hypothesize that alcohol and drug use will be positively correlated with IPV perpetration and victimization. Exploratory analyses will test whether ethnicity impacts the relationship between substance use and IPV. The results of this study will help increase our understanding of the role of substance use in dating violence, which may help inform future clinical interventions to reduce partner violence.



**Tek Williams**  
"A Composite Study of Arcellean Levels in Measuring Wetland Succession at GBMB"  
Co-Author: **Kyle Garmany**  
UHD Faculty Mentor: **Dr. Brad Hoge**  
Project Location: Green's Bayou Wetland Mitigation Bank, Anahuac National Wildlife Refuge, University of Houston-Downtown

An analysis of arcellean assemblages can provide information on the development of mitigated wetlands. In this experiment we used arcellean diversity as an indicator of the health and progression of a man-made wetland in The Greens Bayou Wetland Mitigation Bank. Data collected at a historically pristine wetland (Anahuac National Wildlife Refuge) was used to make a comparative analysis of wetland succession at GBWMB. Samples were collected at three comparable sites at both locations and arcellean diversity and abundance at each location was obtained. The abundance of arcelleans at Anahuac was, as expected, greater than that at the mitigation bank. Species diversity at both sites were comparable. An ANOVA was performed to analyze assemblage correlation. It was found that the locations were significantly different. This suggests that the GBWMB has yet to reach its climax community.



Above and below:  
Conference support staff  
and student assistants  
registering conference  
participants and guests.



Above: Dr. Darshan Wadhwa,  
SRC Committee Co-Chair, and  
Dr. Phil Lyons, UHD Assoc.  
Professor of Biology.



Left: Dr. Ermelinda De La  
Vina, SRC Committee Co-  
Chair, interacting with Dr.  
Kenneth Oberhoff, Assoc.  
Dean of the UHD College of  
Sciences and Technology.



Right: Dr. George Pincus, Dean of the UHD College of  
Sciences and Technology, speaking with Dr. Vicky Estrera,  
Director of the UHD Scholars Academy.



Below: Visitors, faculty and students awaiting the opening  
speech by UHD President Max Castillo.



Pictures on this page were captured during the UHD Student Research Conference lunch break.



At left: SRC oral student presenters, James Alexander and Bjorn Larson enjoying lunch with their UHD faculty mentors.







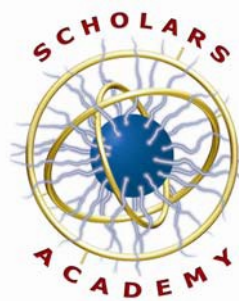
Bottom two pictures:  
participants exchanging their  
conference surveys in  
exchange for their SRC  
memento gift and  
certificates.



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Undergraduates within the College of Sciences and Technology at the University of Houston-Downtown (UHD) are engaged in research on and off-campus year-round and as early as their freshman year. Students are encouraged to participate in full-time paid research programs and internships during the summer months. UHD students look forward to the opportunity to present their research projects at the Student Research Conference held on the UHD campus each spring. During each fall semester, the College provides a Graduate School and Internship Fair to further promote participation in graduate and research programs.

Special thanks to the major sponsors of this conference and a majority of research at UHD: National Science Foundation (0336612), the U.S. Army Research Office (W911NF-04-1-0024), the U.S. Department of Education (P120A050068), the Welch Foundation (BJ-0027), and UHD. Additionally, thanks to the UHD Scholars Academy, which spearheads this conference.



The **UHD Scholars Academy (SA)** is an academically competitive program in the College of Sciences and Technology (CST) that promotes scholarship and student success for undergraduate students majoring in Science, Technology, Engineering and Mathematics (STEM).

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