



Undergraduate Research Day 2011

Thursday, October 13
4:00 p.m.

Elizabeth D. Rockwell Pavilion &
The Honors College

2nd Floor,
M.D. Anderson Library

Poster Presentations by UH Undergraduates

Presented by:

Office of Undergraduate Research &
The Honors College

UNIVERSITY of **HOUSTON**

Undergraduate Research Day

Elizabeth D. Rockwell Pavilion

M.D. Anderson Library

October 13, 2011

4:00 p.m.

4:00-4:40 p.m. Viewing of Student Posters

4:40-5:10 p.m. Welcome and Remarks

John Antel

Senior Vice President for Academic Affairs and Provost

Rathindra Bose

Vice President for Research and Technology Transfer

Stuart Long

Associate Dean of Undergraduate Research and
The Honors College

5:10 p.m. Awards and Continue Poster Viewings

*Thank you to the **Texas Learning & Computation Center (TLC²)**
for printing the posters for the event, and the **Office of Undergraduate
Discovery Programs** for contributing toward the shirts and awards.*

*And a very special thank you to **Provost's office, the Division of Research,**
and **The Honors College** for their generous support of the
Office of Undergraduate Research.*

Welcome to our seventh annual Undergraduate Research Day. This is an exciting event which celebrates the achievements of the 54 students who participated in the 2011 Summer Undergraduate Research Fellowship program, as well as the many other undergraduates who completed mentored research projects during the past year. Although all of you are pursuing a wide range of projects in a variety of fields, you actually have a lot in common. You all have worked extremely hard and are completely dedicated to your research projects. You all have encountered obstacles and frustrations along the way, but found ways to overcome them, building a resiliency that will serve you well in the rest of your educational efforts and really for the rest of your life. You also all seem to genuinely relish your work. As demonstrated here today, many of you get really excited when talking about your research and take pride in what you have accomplished.

For the students presenting at Undergraduate Research Day today, we applaud your achievements. We recognize that research can be challenging, tedious, and at times frustrating. Conducting research as an undergraduate, however, is invaluable in many ways. It offers you the opportunity to think independently, creatively and critically—encouraging and cultivating flexibility in thought. Research also allows you to make a contribution to your field, and to discover new knowledge. It is perhaps one of the best ways to get to know faculty in your field and to develop lifelong mentorships with them. These experiences also acquaint you with graduate and undergraduate students in your field; colleagues and friends we hope you will stay in contact with for the years to come.

We also thank our researchers' faculty mentors. Through the time and energy that you give to these students, you are helping to produce the next generation of leaders. By guiding their work, you are providing an environment in which they can flourish and grow more confident of future successes.

We also are thankful for the faculty who served as speakers in our SURF Brown Bag Lecture Series (visit page 35 for details). Through these lecturers'

contributions, the SURF program provides students with insights that will help them be successful as both undergraduate researchers and as future graduate students or members of the professional workforce. This series is truly integral to the success of our summer research program.

Our selection committee is also instrumental to the success of the Office of Undergraduate Research. In addition to the challenging role of reviewing the many applications we receive for our scholarship and fellowship programs, the committee also provides us with guidance on improving and modifying our office's policies and procedures. We are so grateful to them for their contributions.

Last but certainly not least, we would like to extend our gratitude to the units that support our office each year. Through the funding from the Provost's office, the Office of the Vice President for Research, and The Honors College we are able to directly enrich the academic lives of nearly 200 undergraduates each year through mentored research programs.

Thanks to all for celebrating this special day with us, and for your support of our undergraduate researchers at the University of Houston.

Stuart Long

Associate Dean of
Undergraduate Research and
The Honors College

Professor of Electrical and
Computer Engineering



Karen Weber

Program Director,
Office of
Undergraduate
Research



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October 13, 2011

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Elizabeth D. Rockwell Pavilion

University of Houston

The Honors College

The Office of Undergraduate Research

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Gangbing Song, a Professor of Mechanical Engineering and the Director of the Smart Materials and Structures Laboratory at the University of Houston, was the recipient of the Faculty Award for Mentoring Undergraduate Research for 2011. Since his arrival at UH in 2002, Dr. Song has supported nearly 100 undergraduates through coursework, advising, and mentorship.

In his time at the University of Houston, Dr. Song has applied for, and received, over 1.8 million dollars in grants that involved undergraduate research and has published several articles on the undergraduate research mentoring process.

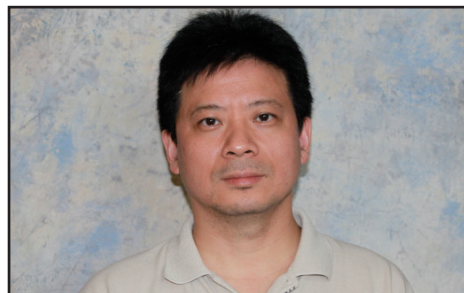
When asked to comment on Dr. Song's undergraduate mentorship, Dr. Matthew Franchek, Professor and Interim Chair of Mechanical Engineering, noted that in almost all of Dr. Song's grants, he specifically designates budgets for undergraduate research. He says, "Dr. Song believes that to involve undergraduate students in research is an effective way to motivate them" and that "several undergraduates have attended graduate school as a direct result of Dr. Song's mentoring." In addition to this, undergraduate researchers under the direction of Dr. Song have published five papers in peer-reviewed journals and presented over two-dozen papers at academic conferences and won numerous awards and competitions involving undergraduate research.

Dr. Song is also extremely active in forging interdisciplinary and inter-university research connections, and his undergraduate students have often benefitted directly from these connections. One of these students, Christiana Chang, has this to say about Dr. Song: "Dr. Song considers engineering education as important as engineering research, and his work with undergraduate students reflects this mentality. I wholeheartedly believe that Dr. Song's

mentorship enriches and enhances the undergraduate experiences of the students he mentors, and that he gives undergraduate students lessons and advice that they can take with them to graduate schools." Working with Dr. Song, Christina has published peer-reviewed articles and conference papers, as well as winning several undergraduate research prizes.

Another student, Claudio Olmi, worked with Dr. Song as an undergraduate researcher in 2004 and had this to say about him: "I have never met a professor as motivated and caring as Dr. Song. The excitement he puts into teaching convinced me to enroll in the Ph.D. program at UH." Consequently, Claudio earned his Ph.D. in fall 2010 in Electrical and Computer Engineering.

When asked about mentoring undergraduates, Dr. Song shares, "With their energy and enthusiasm, I have always found that undergraduate students are valuable members of my research team. It's extremely rewarding to help these students realize they can make real contributions to their field and, in many cases, to set them on the path toward graduate school. I am very grateful for the recognition this award brings to me and my research group, including all the undergraduates I have worked with over the years."



Gangbing Song

Professor of Mechanical Engineering,
Director of the Smart
Materials and Structures Laboratory

SURF 2011 PARTICIPANTS

Effects of Oxidative Stress on Anxiety-Like Behavior, Blood Pressure, Learning and Memory in Rats

SURF Student: Farida Allam

Department: Pharmacological and Pharmaceutical Sciences

Faculty Mentor: Samina Salim

On an average, about 40 million people in the U.S. are diagnosed with anxiety disorders, 10 million of which have hypertension. Mechanisms responsible for the association between anxiety and hypertension are unclear. Recently a causal role of oxidative stress has been reported in anxiety-like behavior of rats and also in hypertension. In this study, we have investigated the effect of induction of oxidative stress on anxiety-like behavior of rats, on hypertension as well as on learning and memory function of rats. L-Buthionine-(S,R)-sulfoximine (BSO) is an oxidant producing agent reported to induce oxidative stress in rats and reported to cause anxiety-like behavior in rodents. We induced oxidative stress in Sprague-Dawley rats using BSO and utilized antioxidant grape powder extract to directly determine role of oxidative stress. We examined learning and memory function using radial arm water maze test followed by anxiety-like behavior and blood pressure measurement. Our results suggest that BSO treatment increased anxiety behavior of rats and treatment with the antioxidant grape powder prevented this behavior. BSO rats exhibited just as many short-term memory errors as the GP rats in the radial water memory maze, but slightly more long-term memory errors. BSO rats displayed a higher systolic, diastolic, and mean arterial pressure than all of the other three groups.



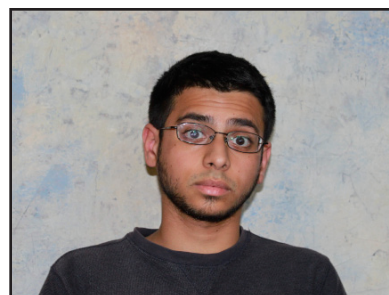
Effect of Sleep on Extinction Process in Classical Conditioning

SURF Student: Syed Anjum

Department: Electrical and Computer Engineering

Faculty Mentor: Bhavin Sheth

Classical conditioning is a learning process that occurs through associations between an environmental stimulus (CS) and a naturally occurring stimulus (US); following the learning, the CS elicits the same reflexive action as the US. Extinction occurs when the response to the CS disappears when the CS is no longer associated with the US. Can extinction occur during sleep? In a counterbalanced design, we associated 2/3 naturalistic tones (CS) with electric shocks (US) – which normally elicit a change in skin conductance (SCR) – during learning and later tested for whether extinction, as measured by a reduction of SCR, occurs during subsequent sleep. Waking subjects (n=5) were conditioned: CS- was not associated with the US while CS1+ and CS2+ were. SCRs to presentation of CS1+ or CS2+ should arise following the conditioning. During sleep, CS- and CS1+ were played but with no shock delivery. This should lead to CS1+ → SCR extinction. The CS2+ → SCR should remain intact, however. If extinction occurs in sleep, we hypothesize that the SCR induced by CS- ≈ CS1+ < CS2+. Thus far, there is not enough conclusive data to recognize a distinct trend. A larger sample size is necessary.





Texas Capital Sentencing Schemes: An Exploration of the Question of Future Dangerousness

SURF Student: Safa Ansari-Bayegan

Department: Political Science

Faculty Mentor: Alison Leland

Capital punishment touches on important areas of ethics and practical politics. The questions it raises often remain unexplored since there is little opportunity to address them in the heat of the appeals process. The question of future dangerousness is central to capital sentencing schemes in Texas insofar as a jury is required to determine whether there is a probability that the defendant will be a continuing threat to society. In Texas, the defendant's fate is determined by the jury's prediction of the likelihood of recidivism in society. Future dangerousness is the sole aggravator in capital sentencing in Texas, in contrast with other active death penalty states. This exploration investigates the inherent problems with the question and its implications on sentencing in Texas, as well as examines how the jury's charge is the basis for awarding the death penalty in Texas is different from other active death penalty states.



The Study of Hippocampal Circuit's Excitability and Effects of Senile Plaques on the Signal Propagation in Alzheimer's Disease Model using Fast Functional Live Cell Imaging and Electrophysiology

SURF Student: Ahmad Aulakh

Department: Biology and Biochemistry

Faculty Mentor: Jokūbas Žiburkus

Alzheimer's disease (AD) is a progressive neurologic disease of the brain that leads to the irreversible memory loss and dementia. One of the AD hallmarks is the formation of senile plaques. Senile plaques form because of the mutations in the gene coding amyloid-beta precursor protein (APP). Some of these plaques form in hippocampus, a structure involved in memory formation/retrieval; but it is unknown how they affect neural activity. We combined fast functional imaging and electrophysiology to study how the plaques affect individual neuron activity and signal propagation in the hippocampal networks of transgenic APP mice. We discovered that 'memory input pathway' in the hippocampus is hyper-excitable and that inhibitory neurons along this pathway fail to produce action potentials. Our findings suggest that the plaques affect individual neuron properties and the collective network activity. These mechanisms could account for early memory loss in AD and suggest novel therapy targets for dementias.



Determining Morphology of Interneurons Affected by Amyloid Plaque Pathology in APP/PS1 Mice, a Model of Memory Loss in Alzheimer's Disease

SURF Student: Jon Berridge

Department: Pharmacological and Pharmaceutical Sciences

Faculty Mentor: Jason Eriksen

The dentate gyrus (DG) is an important gateway to hippocampal function, which is involved in memory creation, behavioral inhibition and attention. To further elucidate a direct cause of the symptoms of Alzheimer's Disease (AD), we investigated cells in the DG that are afflicted by amyloid plaques, a hallmark of AD. The failure of multiple cells in the DG can have an enormous effect on the entire hippocampus, causing large disruptions in neural networks and in short-term memory.

Interneurons of the DG in APP(+) mice showed a rundown in action potential. In this study, individual interneurons were stained with immunofluorescent markers and imaged using confocal microscopy to make 3-dimensional models. With these models, we can determine if altered morphology correlates with amyloid plaques. These observations may help to explain why there is such a large rundown in interneuron function and why these cells might not be able to propagate signals efficiently throughout the DG.



Dynamically-Adapted, System-Specific Coherent States for Approximations of Excited State Energies and Wave Functions of Bound Quantum Systems

SURF Student: Mason Biamonte

Department: Physics

Faculty Mentor: Don J. Kouri

Instead of using the standard harmonic oscillator coherent states as a basis for approximating the excited state energies and wave functions of bound quantum systems, we used the ground state wave function of the system of interest. We did this to construct an overcomplete set of coherent states which were specifically associated with the Hamiltonian under investigation. Due to the fact that the ground state solves the time-independent Schrödinger equation for the Hamiltonian of interest, a basis assembled from it necessarily builds in information about the dynamics of the entire system. We demonstrated this conjecture by carrying out a variational calculation with a discretized, system-specific coherent states basis and compare the accuracy in the approximation of the excited state energies with other bases.





Effects of Repeated Inescapable Stress on Dorsal Raphe Nucleus of Learned Helpless and Non-Helpless Rats

SURF Student: Kayla Bicol

Department: Pharmacological and Pharmaceutical Sciences

Faculty Mentor: Douglas Eikenburg

When rats were exposed to an inescapable unpredictable stress and then tested for escape behavior from a milder stress, about half showed an impaired ability to escape, so-called learned helplessness (LH) while the remainder showed a normal escape behavior, non-helplessness (NH). The dorsal raphe nucleus (DRN), the largest serotonin-producing nucleus in the brain, is important in the development of learned helplessness and is a target of antidepressant drugs. The present study investigated the effects of repeated inescapable stress on the levels of alpha(2A)-adrenoceptor ($\alpha(2A)$ -AR), G protein-coupled receptor kinase 3 (GRK3), GRK2, and tryptophan hydroxylase (TPH2) in the DRN of LH and NH rats. We observed no changes in any of the proteins measured in the DRN of LH or NH rats compared to non-stressed controls. Therefore, the results did not reveal any changes in the DRN of LH rats that might help understand the role of the DRN in learned helplessness.



Boroxine-Based Polyhedral Organic Capsules and Extended Frameworks

SURF Student: Nghia Bui

Department: Chemistry

Faculty Mentor: Ognjen Š. Miljanić

Metal-organic frameworks (MOFs) and the related covalent-organic frameworks (COFs) are crystalline compounds that have extremely high porosity and high available surface area for gas adsorption. Their synthesis from molecular building blocks allows for direct tailoring of adsorption properties, pore sizes, and pore polarity. MOFs and COFs can also be used as platforms for asymmetric catalysis, precursors to heterogeneous catalysts, and selective sensors for a variety of small molecules. During the SURF program, ferrocene-1,1'-diboronic acid was synthesized as a precursor for a trimer with triangular boroxine cage. The dehydration of ferrocene-1,1'-diboronic acid yielded an unprecedented ferrocene boroxine trimer. The rigid structure of this compound was very interesting as one of the rare small ferrocene clusters, and allowed insights into the theoretically important concept of aromaticity. Other compounds such as 1,3-Benzenediboronic acid, anthracenyl-1,8-diboronic acid, and anthracenyl-1,5-diboronic acid have been studied as precursors to boroxine cages and infinite networks.



The Role of L27's K4 Residue in Stabilizing the Ribosome's Post-Translocation Complex

SURF Student: John Buikema

Department: Biology and Biochemistry

Faculty Mentor: Yuhong Wang

The ribosome is a molecular machine that synthesizes proteins in all cells. Previous studies have shown that the L27 protein's N-terminal end is necessary for normal levels of protein synthesis, however the exact role of this ribosomal protein is not well understood. Experiments indicate that the N-terminal residue Lysine 4 (K4) interacts with peptidyl tRNA to minimize ribosome fluctuation in the post translocation complex. In my project, I investigated the mechanism of this interaction by studying the dynamics of a ribosome mutant in which the K4 residue was replaced by a glutamic acid (K4E). Utilizing single molecule FRET and TIRF microscopy, I found that the K4E mutant behaved similarly to wild type ribosomes, showing almost identical non-fluctuating and fluctuating FRET profiles. These results imply that either the glutamic acid is not negatively charged at high pH (contrary to the free amino acid), or the interaction between L27 and tRNA is not coulomb force. Further pH titration experiments will test these possibilities.



Two Spheres: Bridging the Real and Ideal

SURF Student: Sara Carter

Department: Architecture

Faculty Mentor: Leonard Bachman

The Two Spheres Theory (Bachman) defines two realms of design thinking (the physical: ideal, transcendent, immediate and the strategic: real, functional, foresightful) that continuously inform one another through complex and dynamic interactions, potentially culminating in a building that is more than the mere sum of its parts. The architect must bridge these two spheres so that each engages the other in a holistic manner. To synthesize this process of design thinking, the Genzyme Center, widely regarded for its affective and effective qualities, was selected as a case study to be "reverse architected." The building's characteristics (including form, intention, criteria, site, climate, passive lighting & thermal systems, structure, envelope, zoning and services) were documented and analyzed for relationships and interactions amongst them. The architect's design decisions were then traced beyond the isolated components, towards the systemic thinking that produced the integrated building. Thus, a greater understanding of the interaction and influence the strategic and physical realms had on each other was achieved.





CasteAways: A Resuscitation of Third Ward

SURF Student: Brittney Connelly

Department: Art

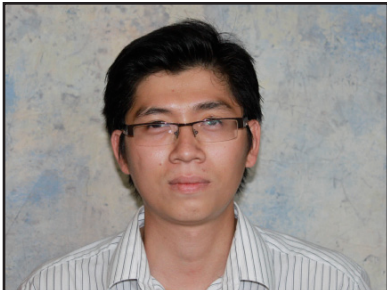
Faculty Mentor: Stephan Hillerbrand

CasteAways: A Resuscitation of Third Ward is an installation/performance work that becomes a metaphor for a commodified American culture. The project confronts issues of neighborhood supplantation and its' parallel with product replacement.



Discarded furniture from the streets of Third Ward is reconstituted in a cast of paper and flour. Blanketed in white, the non-functional objects that once contained a history and energy become mere obstructions in space. In an attempt to recondition the state of these de-contextualized objects, I will intervene in the process by detaching the obstructions and redistributing the pieces as realizable objects.

The work is presented in one of Third Ward's shotgun homes hosted by Project Row Houses. Furniture found on the streets of Third Ward reactivate the historically-charged space.



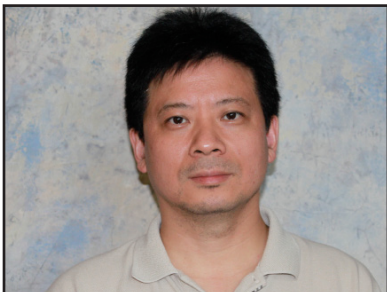
Miniature Battery-Operated Piezoceramic Amplifier

SURF Student: Quang Do

Department: Mechanical Engineering

Faculty Mentor: Gangbing Song

A miniature battery-operated piezoceramic amplifier for wireless Active Structural Health Monitoring systems and Labs To Go kits was designed to provide similar features as commercial amplifiers, but in a smaller size and lower cost. The miniature amplifier was developed to perform voltage amplification, and capable of running on batteries while providing a bandwidth of 17k Hz at around ± 100 Volts output voltage. Several prototypes have been fabricated and tested for efficiency and accuracy, and then successfully applied to the Labs To Go kits. This research enabled us to have a better understanding about the miniature amplifier's advantage and properties in lab condition as well in practical experiment.



The Traditions, Techniques and Sustainability of The Finnish Forest Industry and Wood Architecture

SURF Student: Malin Donner

Department: Architecture

Faculty Mentor: Donna Kacmar

This research evaluated the sustainability of the forest industry and wood architecture in Finland. Finland's forests are growing and the forest industry in Finland, and elsewhere, is sustainable. However, the loss of biodiversity is a problem. Although wood is weaker than steel and more prone to damage, its production consumes much less non-renewable natural resources and energy than steel, concrete or brick and CO2 emissions are lower. Finnforest Modular Office, St. Henry's Ecumenical Art Chapel, Viikki Church and Kupla Lookout tower were used as contemporary case studies. In most of these examples prefabricated parts were used, but still some traditional design principles were followed. In conclusion, the benefit of wood construction lies in its sustainability and the drawbacks mostly in the weakness and anisotropy of the material.



Predicting Users' Responses in Social Media: From Needs to Expressiveness on Facebook

SURF Student: Iris Edelen

Department: Decision & Information Sciences

Faculty Mentor: Norman Johnson

This research is about social media with a focus on Facebook. The main way for companies to get users' responses on Facebook is through a variety of messages referred to as "posts." The goal of this study is to determine how users' responses are affected by these posts. Every post is defined by an intended strategy to yield a response. Three common strategies are to: *persuade*, *stimulate*, and *entertain*. But according to **self-determination theory**, people respond to stimuli based on innate needs to express themselves. Two of these needs are to show competence and to relate to a stimulus or message. We predict that some responses to messages in the form of comments will reflect these needs, and have less to do with the main content of posts. We also predict that when some needs are met by a post, people will respond with an agreeing response, such as "Like." Our research finds that posts that aim to persuade increased the number of "Likes" and competence related comments. And, as the number of "Likes" increases so too does the number of all types of comments. In contrast, posts that aim to stimulate decreased the number of "Likes." Finally, post that aim to entertain increased the number of relatedness comments. These results not only reveal to what extent posts are effective, but they also tell in what ways do users relate to these posts.



Collective Charge Density Wave Transport in Niobium Triselenide



SURF Student: Nebolisa Egbunike

Department: Physics

Faculty Mentor: John Miller

My research was based on the charge density wave properties of Niobium triselenide (NbSe₃). When electron charge density is modulated at low temperatures, a charge density wave is formed in NbSe₃. The properties of a thin NbSe₃ crystal were measured by mounting it on four gold electrode pads with silver paste. The sample was cooled in a temperature controlled Helium gas cryostat under high vacuum. Temperature dependent resistance and voltage dependent current were measured by connecting a current source and a voltmeter in four electrode set-up. Upon cooling, NbSe₃ undergoes a transition to charge density wave states at temperatures 145 K and 59 K respectively. NbSe₃ sample shows nonlinear current- voltage (I-V) characteristics at temperatures (125 K and 25 K) below the transition temperatures while at higher temperatures, (eg. 175 K), it shows linear I-V characteristics. The results show a charge density wave current in NbSe₃ below transition temperatures.



Neoliberalism in the Arab World: Its Effects on Democracy through Inequality and Rent-Seeking



SURF Student: Dana El Kurd

Department: Political Science

Faculty Mentor: Olivia Miljanić

With the recent uprisings in the Arab world, the region's lack of democracy has become a hot topic once again. This study applies a democratization theory—the theory of modernization—to the Arab world. The theory states that economic development is the key to future political liberalization and reform. Mainstream economics today as posited by international development organizations, such as the International Monetary Fund, argues that neoliberal economic policies are the best way a country can develop its economy. Thus the questions are: How have neoliberal economic policies affected democracy in the Arab world? Have these policies harmed, or helped, the region's possibility for change? This research examines how neoliberal economic policies have an effect on rent-seeking and inequality, and how these factors are important to democracy.



Niños Activos

SURF Student: Joshua Ellis

Program: Medicine and Society

Faculty Mentor: Helen Valier

Principle Investigator: Teresia O'Connor

We pilot tested a model that assessed environmental and parental influences on Hispanic preschool children's physical activity, which was proven to lower the chance of becoming obese. Childhood obesity rates in the United States have almost doubled in the past decade, and certain minority groups are disproportionately affected, particularly the Hispanic population. In addition to this, the Hispanic population is the fastest growing population in the country, and is also in many cases limited in its access to healthcare. The model we are testing tracks the physical activity of children through various neighborhoods identified with variables such as traffic, crime, and parks. A questionnaire was simultaneously tested to evaluate the effects of parental practices and cultural influences on the children's physical activity.



Politics and Corruption: An Assessment of the Activities of the Public Integrity Section

SURF Student: Rachel Farhi

Department: Political Science

Faculty Mentor: Lydia Tiede

This project explores the activities of the Department of Justice's Public Integrity Section, one of the only government agencies devoted solely to the enforcement of ethics regulations, since its creation in 1978. Pursuant to the Ethics in Government Act, the Section reports its activities and priorities annually, including select cases, investigations, and legislative changes. The study examines whom the Section holds accountable and for what, finding common characteristics of corruption. Reported cases affecting the federal government (1985-2009) are coded into a dataset and summarized using binary variables. Types of crimes committed, what branches are most affected by federal official corruption, and other variables are considered. Results show increasing caseloads, a common set of crimes committed by a diverse range of employees (mostly of the executive branch) and private citizens, a concentration on four areas of crime, and other trends. Further research will analyze region, level of employee, and possible correlation between ideology and sentencing in corruption cases.





Verification of the Inverse Womersley Method

SURF Student: Parsha Forouzan

Department: Biomedical Engineering

Faculty Mentor: Ralph Metcalfe

In 1954, J. R. Womersley introduced a new method for calculating hemodynamic variables, such as axial velocity, volume flow rate, and viscous drag, when the pressure gradient is known. Using Womersley's method, the pressure gradient within an artery can be measured, and through some mathematics, the velocity of the blood at the center of the artery, the flow rate of the blood, and the shear stress at the wall of the artery can be calculated. Each of these parameters can provide insight into cardiovascular diseases. The inverse Womersley method differs from the traditional Womersley method in that the input variable is the volume flow rate instead of the pressure gradient. This is advantageous because the pressure gradient is difficult to measure. In order to verify the accuracy of the inverse Womersley method, MATLAB was used as the analytical solver, and the result was compared to a Fluent solution. Although the velocity solutions that were obtained had a maximum error of 8.8 % (due to an inaccurate estimation of the entrance length of the flow), the pressure gradient graphs showed hope that Womersley's method could be a reasonable substitution in a technologically or financially restricted situation



Synthesis and Study of Cholesterol-Based Carboxylic Acids for Use in Langmuir-Blodgett Monolayers

SURF Student: Thomas Frank

Department: Chemistry

Faculty Mentor: T. Randall Lee

The "cholesterol condensing" effect is a phenomenon that allows hydrocarbon chains to pack more densely when cholesterol is present. To explore this, molecules have been synthesized for use in Langmuir-Blodgett monolayers. This monolayer consists of amphiphilic molecules that attach to the surface of water. The head group is polar and water soluble, while the tail group is a hydrocarbon chain extending into the air. The tail group is responsible for the high degree of order and will be synthesized with various carbon lengths that terminate with cholesterol. Future research will form the monolayers and complete surface analysis to determine which hydrocarbon chain length affords the greatest packing density. This research offers many applications for biomedical coatings to pharmaceutical drug applications.



A Hydrazone Activated Diels-Alder Approach for Synthesizing Compounds with an Angular Methyl Stereocenters

SURF Student: Stephanie Fuentes

Department: Chemistry

Faculty Mentor: Jeremy May

The goal of this research project was to develop a method to synthesize cis-fused rings with a methyl group at the angular position. Many biological active natural products, such as anthemine B, share similar structural motifs to this eudesmane. The proposed approach was to use a hydrazone in order to electronically and sterically induce the desired addition to happen. The studied reaction was divided into four steps. The first step was to make the hydrazone from the commercially available dihydroxybenzaldehyde. The second step was a one-step oxidation of the hydroquinone to yield the hydrazone activated quinone, which then underwent a Diels-Alder reaction with the diene. The final two steps reduced the carbonyls and the hydrazone to yield the desired target compound with the angular methyl group. In order to test the versatility of this method, different dienes will be used in the future.



Following Global Trends: Panamanian Health Care Professionals' Perspectives on Medical Tourism

SURF Student: Emilie Glass

Department: Sociology

Faculty Mentor: Samantha Kwan

Promoted by the Panamanian government because of its profitable nature, medical tourism in Panama offers patients from around the globe the benefit of a smaller bill and a range of treatments. Medical tourism infuses outside money into local economies, fostering medical competition and the development of medical infrastructure. Current research on medical tourism focuses on the perspectives of the medical tourist at the expense of gaining an understanding of this global phenomenon from a local perspective. How do Panamanian medical professionals view medical tourism? In their view, how is medical tourism impacting the provision of local medical services? A survey of sixty Panamanian medical professionals suggests widespread support for medical tourism, but with important distinctions by professional subfield and education. Findings point to a positive correlation between respondent's level of education and favorability towards medical tourism and underscore the importance of studying this growing global phenomenon, particularly from the vantage point of local practitioners.



Allocation of Attention for Dynamic Stimuli in Human Vision



SURF Student: Hamza Hallal

Department: Electrical & Computer Engineering

Faculty Mentor: Haluk Ogmen

Shifts in attention allow us to analyze complex visual scenes. In this project, we study exogenous attention, or shifts in attention that are due to human reflexes and not voluntary effort. It has been shown in previous literature that attention can be attracted to both a location and to “objects”. In the present study, we focus on understanding the effects of these objects in a dynamic environment. While in static environments, they have been shown to cause both facilitating and inhibitory effects (i.e. they can make shifting attention either easier or more difficult depending on the conditions), there has been no previous research into whether a facilitating effect is present in a dynamic environment. A new paradigm was developed to allow for moving objects to keep constant eccentricity. In addition, the time frames of the presentation were similar to those used in previous experiments that showed facilitating effects in static environments. The results show that there is indeed an object based facilitating effect, not only when shifting attention between objects, but also when shifting attention between an object and a location in space.



Socio-cultural Realism: The Study of Ideas and Human Agency

SURF Student: Kim Harrison

Department: History

Faculty Mentor: Thomas Behr

Socio-cultural realism is a historical methodology that seeks to understand historical figures holistically by looking at their ideas in context. This approach examines how human agency and sociological factors interact with each other to result in human thought and action by ascertaining how they fit into at least three paradigms: material, social, and intellectual/spiritual. Instead of taking a more limited approach, such as linguistic structuralism, which reduces all thought to language, or Marxism, which reduces human action to reactions to economic factors, socio-cultural realism takes into account the political, social, economic, and intellectual realities which shape ideas and direct human action.



Fricative Acquisition in Bilingual Hearing Impaired Children Who Use Listening Devices

SURF Student: Shannon Harrison

Department: Communication Sciences and Disorders

Faculty Mentor: Ferenc Bunta

This study examines the production of English fricatives by Spanish-English bilingual children and their monolingual English-speaking peers who are hearing impaired and use cochlear implants. Past research has shown that typically developing Spanish-English speaking bilingual children acquire fricatives differently from their English monolingual counterparts (Ertmer & Goffman, 2011). In addition, cochlear implants provided an impoverished signal that affected fricative acquisition, making them disproportionately harder to acquire than other speech sounds (Fabiano-Smith & Goldstein, 2010). Thus, cross-language differences and a diminished signal provided by the cochlear implant conspire to make fricative acquisition especially difficult for Spanish-English speaking bilingual children who are hearing impaired. Besides theoretical implications, the results of this study could help Speech-Language Pathologists design more effective assessment and intervention practices for supporting bilingual children who are hearing impaired as they develop appropriate speech sound skills.



Online Files Sharing Behavior

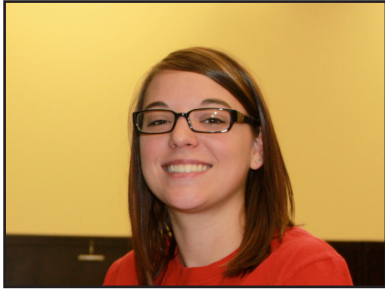
SURF Student: Dawn Hunter

Department: Management Information Systems

Faculty Mentor: Blake Ives

The internet has created massive cracks in the fabric of intellectual property (IP) law. The owners of intellectual property have been intensely trying to protect their content, and perhaps as a consequence many others feel that they have a right to make illicit copies. That “right” also extends to wireless internet access. While the inappropriate use of internet resources is a broad one, this study focused on one phenomena, the unauthorized access and use of wireless internet service. The majority of students take issue with this behavior—and while many express the risks, there are still supposed benefits of the behavior. Using a qualitative data collection survey method, we have gathered information about students’ uses, motivations and behaviors regarding intellectual property rights associated with digital property and access. By stressing the risks associated with this behavior, we will ultimately improve student behavior with regards to unauthorized use of wireless internet services.





Impact of Intervention in Reading Curriculum with Special Education Students

SURF Student: Taylor Jett

Department: Curriculum and Instruction

Faculty Mentor: Jacqueline Hawkins

For my research, I performed an extension upon Dr. Dana Kelly's doctoral dissertation over Response to Intervention. Response to Intervention (RTI) is a specific academic intervention method used in early education to provide assistance to students who are faced with educational struggles. There were 54 students who participated in the original study. Four of these students needed the greatest level of support and were the focus of my research. I looked within the students' results and found out how the scoring of the probes was determined. Next, I targeted where the students were having problems and performed an error analysis. After the analysis, I concluded that the error patterns had minimal change throughout the testing period. In conclusion, this study increased my understanding of how students who receive Special Education services respond to curriculum based measurements and to determine the most effective way to meet the students' individual needs.



The Limits of Civic Virtue: An Investigation of the Limitations of Civic Devotion in Xenophon's *Regime of the Lacedaemonians and Cyropaedia*

SURF Student: Catrina Kim

Department: Political Science, *Phronesis* Program

Faculty Mentor: Susan Collins



In *Regime of the Lacedaemonians and Cyropaedia*, Xenophon examines the nature and extent of civic virtue in the context of three distinct regimes: Ancient Sparta and the fictionalized Old Persia and New Persia. Through an analysis of Xenophon's treatment of these three regimes, I investigated the limitations of civic virtue beginning with Ancient Sparta. A fundamental problem arose: by making civic devotion primary, Sparta neglects the best condition of its citizens' souls. Xenophon addresses this problem in the *Cyropaedia*: caring for the good of the individual soul, Old Persia begins by habituating citizens to virtue through the rule of law. But Cyrus, the founder of New Persia, overturns the Old Persian regime, seeking to overcome the inability of law to achieve the good in each individual case. Yet Xenophon is, finally, critical of Cyrus's rule: Cyrus, who claims to rule through absolute wisdom, fails to educate his citizens to virtue.



The Cult of MacAgy

SURF Student: Chelby King

Department: Art

Faculty Mentor: Sandra Zalman

Jermayne MacAgy (1914-1964) was a museum director who brought an unusual and unique set of skills in curatorship, museum management and installation to the Contemporary Arts Museum Houston (CAMH), Museum of Fine Arts Houston (MFAH) and St. Thomas University. However, she is relatively unknown. An analysis of data from the archives of these institutions and the archives of The Menil Collection and Museum of Modern Art revealed that Jermayne MacAgy's innovative exhibitions had a powerful influence on the art community, her colleagues, her students and the general public at the time. Houston continues to be influenced by MacAgy and how she permeated the consciousness of Houston's art institutions, artists, scholars and collectors. Additionally, The Menil Collection, recognized world-wide as an important art institution with considerable influence, is tied to the MacAgy tradition. The study of MacAgy will shed light on her importance and the wide-spread impact of her work and will join a growing body of research and documentation on the recent histories of Houston art institutions.



Superposition of Transient Growth Modes

SURF Student: Dustin King

Department: Mechanical Engineering

Faculty Mentor: Fazle Hussain

We studied the superposition of transient growth modes on a vortex column using Direct Numerical Simulation of the Navier Stokes equations. The transient growth modes were selected as the largest growing modes on an Oseen vortex. These modes dominated the flow outside of the column and can induce significant decay or core fluctuations. An axisymmetric and bending wave mode of small amplitude (selected for maximum growth) were superposed onto a vortex column and studied to determine their interaction in the linear regime. Our preliminary analysis showed that axisymmetric modes dominated outside of the core while bending waves dominated the inside of the core. Further study will include growth of each individual mode and simulation of nonlinear amplitudes.



Hazard Analysis and Critical Control Points in Hotel Rooms



SURF Student: Katie Kirsch

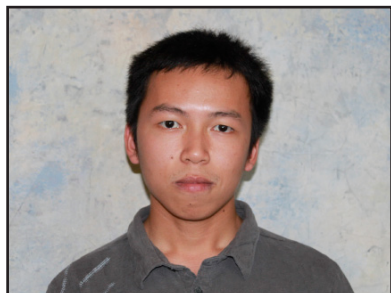
Department: Hotel and Restaurant Management

Faculty Mentor: Jay Neal

Hotel cleanliness has been cited as the most important expectation for hotel business travelers, yet a significant difference in performance vs. expectation has been clearly demonstrated. In particular, cleanliness of bathrooms and toilets has been identified as a critical area where guest expectations are not met. Research is therefore being proposed to develop a model to assess and test the cleaning method of hotel rooms that management might use to improve the cleanliness of rooms and better meet guest expectations. For this model, the use of Hazard Analysis of Critical Control Points (HACCP) was proposed. Standard methodology for setting up a Hazard Analysis of Critical Control Points (HACCP) model was adapted for use in a novel setting, the hotel room. Subsequent studies to be considered include a comparative to correlate current cleaning methods and chemicals to the total aerobic and coliform bacterial counts. Alternative cleaning tools or methods aimed at reducing the potential cross contamination from these items should be investigated. The effectiveness of various validation methods (ATP and bioluminescence) for the cleaning of hotel rooms will be tested. Findings from this and subsequent studies could potentially be transferred to cruise ships.



Light Scattering Characterization of the Mesoscopic Clusters in Hemoglobin Solutions



SURF Student: Duong Lam

Department: Chemical and Biomolecular Engineering

Faculty Mentor: Peter G. Vekilov

Mesoscopic clusters of a dense protein liquid are a necessary kinetic intermediate for the formation of solid aggregates of native and misfolded protein molecules. These clusters have been observed with several proteins well outside the regime of macroscopic liquid-liquid separation and even above the crystal solubility line. The clusters measure as much 100 protein sizes across, contain up to one million protein molecules, and exhibit lifetimes of the order seconds. Even though the dense liquid clusters contain only a small fraction of the total protein, they are of interest because they are the predominant sites of nucleation of protein crystals. Similarly, protein aggregates involved in several pathologies, such as the hemoglobin polymers in sickle cell anemia, or fibrils of misfolded proteins in several neurological disorders, likely initiate within these dense phase clusters. To control the formation of protein crystal and aggregates, it is imperative to establish how the clusters form.



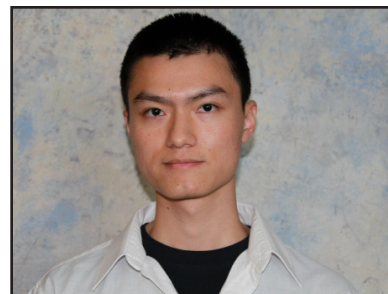
Antimicrobial Properties of Graphene Nanocomposite Materials and Filters

SURF Student: Alex Leon

Department: Civil and Environmental Engineering

Faculty Mentor: Debora Rodrigues

Conventional chemical disinfectants such as chlorine, chloramines and ozone have been used extensively in water treatment plants for effective removal of pathogens. However, these chemicals can form harmful disinfection byproducts. Therefore, alternative methods addressing such issues are highly desirable. Because of graphene's properties (i.e. antimicrobial and easy dispersion with other materials), conventional micro-filters were modified with this nanomaterial. By combining graphene (G) with polyvinyl carbazole (PVK), a nanocomposite PVK-G was created with only 3% of graphene. Antimicrobial properties of the modified filter membranes were tested in suspensions containing pure cultures of *Escherichia coli*, *Bacillus subtilis*, *Cupriavidus metallidurans*, and *Rhodococcus opacus*. Filtrates were plated for quantification of colony forming units and to determine microbial removal from the water. Microbial viability tests using live-dead staining and fluorescence microscopy were also performed on the membranes. The results suggested that PVK-G filters can be very effective for pathogen removal from water.



Digital Spaces: Using Vwire and Omeka.net to Understand the Visual Culture of Teotihuacan

SURF Student: Lauren Lovings

College and Department: Honors College and Art

Faculty Mentors: Dan Price and Rex Koontz

Vwire is a visual research tool that allows scholars to make arguments with images by creating competing arrangements, and then evaluating those relationships. This project has revolved around preparing Vwire by building and organizing the collection of Teotihuacan mask images for our collaboration with experts in archaeological and art historical fields. With funding from a NEH Digital Humanities Start-Up Grant, these scholars will be interviewed on their experiences using Vwire. A related virtual exhibition on eight specific masks will bring together my previous work with current Vwire work. It will focus on the features of each of the masks, and explore the features that are inherent to exemplary masks from Teotihuacan. While also using Vwire, this exhibition will explore the digital space of Omeka.net, an online exhibition website, as well as a physical space in the Visual Resource Library at the School of Art.



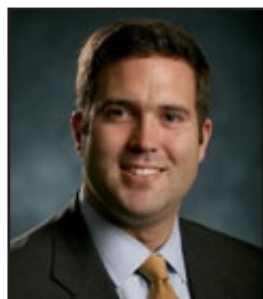
Synthesis of Zeolite Beta (BEA) using Crystal Growth Inhibitors for Enhanced Catalytic Properties



SURF Student: Miguel Maldonado

Department: Chemical and Biomolecular Engineering

Faculty Mentor: Jeffrey Rimer



Zeolites are crystalline microporous materials used in industry as ion exchangers, adsorbents, and catalysts. Zeolite beta (BEA) particles were synthesized via hydrothermal crystallization in hydroxide media. BEA zeolite is usually an intergrowth of two zeolite phases, polymorphs A and B. In an attempt to enrich the zeolite beta crystals in one phase, various crystal growth inhibitors were used. These are thought to function by preferentially attaching to a given crystal face and hindering growth. XRD and SEM were used to characterize the crystals and in the process of testing different syntheses times, it was found by XRD that a different zeolite grows from the same synthesis mixture.

Vertical Profile Analysis of Ozonesonde Measurements from TCEQ Monitoring Site CAMS 75 at Eagle Mountain Lake



SURF Student: Stephanie Mathew

Department: Earth and Atmospheric Sciences

Faculty Mentor: Barry Lefer



While stratospheric ozone shields Earth from UV radiation, ozone in the lower troposphere has been shown to negatively impact health. This research focused on eight ozonesonde launches that occurred during a field campaign in June 2011. Field measurements were obtained using an ozonesonde and radiosonde payload attached to a weather balloon for flight to altitudes around 28 km. Key results included a backward trajectory for June 24 featuring rapid vertical transport from the surface. A convection column produced by a wildfire may have caused this transport. Ozonesonde data was consistent with biomass burning and there were reports of wildfires in the area. Also, analysis of the overall data set indicated a negative correlation between tropospheric ozone and relative humidity. A chemical reaction between water and ozone could account for this relationship. Further investigation is necessary to prove the conjectures set forth by this research and to better understand the chemistry of our atmosphere.

Independent Resources for Information Transfer into and Maintenance of Information in Visual Working Memory

SURF Student: Shon Mondragon

Department: Psychology

Faculty Mentor: Bruno Breitmeyer

Visual information processing can be understood by several stages going from the earliest purely sensory registration known as iconic memory to a more abstract representation of the visual scene in post-iconic visual working memory (VWM). Maintaining information in visual working memory, e.g., rehearsing/holding 2-4 visual items, is known to be limited by attentional capacity. However, the transfer of information from the iconic level to VWM, while thought to require attention, does not show signs of drawing on the same attentional resource.



Identification of Proteins Secreted from Single Cells Using Patterned Protein-Functionalized Magnetic Bead

SURF Student: Truc Ngu

Department: Chemical and Biomolecular Engineering

Faculty Mentor: Navin Varadarajan

To advance medical treatments, we must understand the functioning of the human immune system, preferably at the single-cell level. The method we plan to use is protein-functionalized magnetic beads in combination with arrays of fabricated microwells. This method serves as a more efficient method of identifying proteins secreted from single cells than the current method, which is called microengraving. However, the difficulty that arises was patterning the beads on the glass slides. We have explored different strategies for bead functionalization and not surprisingly covalent modification seems to work the best.





Blockade or Deletion of the β_2 -Adrenoceptor Inhibits IL-13 Induced Mucous Metaplasia in Mice and Cultured Human Airway Epithelial Cells

SURF Student: Adedoyin Okulate

Department: Pharmacological and Pharmaceutical Sciences

Faculty Mentor: Brian Knoll



We previously determined that blockade or genetic deletion of the β_2 -adrenoceptor (β_2 AR) decreased mucous metaplasia, airway hyperresponsiveness, and inflammation in an allergen-driven murine model of asthma. However, the mechanism of these effects is unknown. Here, we examine the role of β_2 ARs in airway epithelial cells in vivo/vitro models in response to interleukin-13 (IL-13), a critically important cytokine implicated in allergic asthma. Quantification of periodic acid fluorescent Schiff (PAFS) of lung sections was completed and analyzed for epithelial cell mucus content from mice that had undergone deletion of the β_2 AR, in response to recombinant IL-13. Additionally, transgenic mice were generated to examine the sufficiency of reconstitution of β_2 ARs on airway epithelial cells in the restoration of the asthma phenotype. Cells were assessed for MUC5AC transcripts by quantitative RT-PCR. The marked reduction mucus production by deletion of the β_2 AR in mucous metaplasia in mice administered IL-13 directly into the airway suggests that β_2 AR signaling interacts with IL-13 receptor signaling in airway epithelial cells. This inference is supported by a requirement for the β_2 AR agonist epinephrine in IL-13-induced up-regulation of the MUC5AC gene in airway epithelial cells in vitro, and its abrogation by β_2 AR blockade with nadolol.

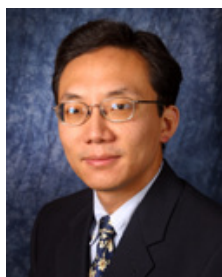


Designing and Fabricating Multi-Diameter Nanowires Using the Nuclear Track Method

SURF Student: Christopher Ortega

Department: Mechanical Engineering

Faculty Mentor: Li Sun



Multi-layered porous templates with individual layered controllable pore diameter were designed and fabricated using the nuclear track process. Alternating films of muscovite mica (100 orientation) and polycarbonate (PC) were fabricated by spin coating, and then irradiated with 84Kr ions at 15 A-MeV from Texas A&M's k-500 cyclotron at fluences up to 5×10^9 to create nuclear tracks. Pores were then created from these nuclear tracks by chemical etching, with the PC nuclear tracks etched with NaOH, and the mica tracks etched with HF acid. This allowed for individual layer controllable pore diameter, due to PC's resistance to HF, and mica's resistance to NaOH. These templates will be used for future electrodeposition to fabricate multi-diameter magnetic nanowires.

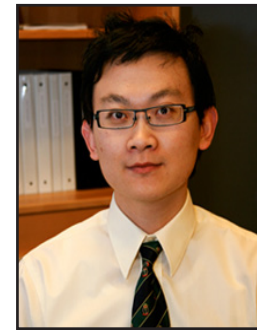
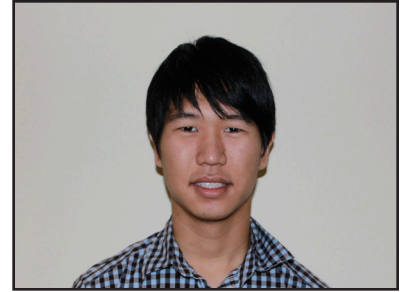
The Effect of a Novel Perturbation Training Program on the Risk of Low-Back Injury

SURF Student: Joshua Paek

Department: Health and Human Performance

Faculty Mentor: Jian Liu

According to the Center for Disease Control and Prevention, one of the leading causes of hospitalization in younger children and death in the older population are falls. However, a novel paradigm training paradigm emerged, suggesting that an individual can adaptively enhance their stability. The aim of this study was to investigate the effects of a novel perturbation training program in reducing the risk of low-back injury. In order to investigate these effects, we formed two groups out of 18 participants (the training group and control group) and placed an accelerometer on their lower back. Furthermore, we placed them on a split belt treadmill and had the participant walk for 2 sessions. For the first session, the training group underwent multiple cycles of randomized perturbations while the control group went through just one cycle of perturbations. For the second session, both groups went through one cycle of perturbations. Through analysis, both groups were compared and the critical acceleration of the training group was found to be lowered during the perturbations because of the stability adaptation and therefore proved to reduce the risk of low-back injury.



Romantic Philosophies behind Byron's *Don Juan*

SURF Student: Luke Patterson

Department: English

Faculty Mentor: James Pipkin

At the start of this research project, my goal was to examine Lord Byron's creation Don Juan as a means of soul-making, and the way in which this process mirrors the struggle within the poem to find meaning and construct the self. These ideas about the self as process, for me, had interesting philosophical dimensions, particularly in relation to Schlegel's Romantic Irony (Cf. Anne Mellor's English Romantic Irony). I wanted also to look at the way Carl Jung dealt with these ideas in his works, which were influenced themselves by romantic thought. Mellor's English Romantic Irony turned out to be the most important text in terms of my research on Byron. Much of what Byron does in Don Juan is satire. He sees the world as fundamentally chaotic, and in a way the satiric form reflects this—it deconstructs through irony any absolute order in natural or human events. The philosophy of Friedrich Schlegel, like Byron, will say that the most prominent character of nature is a flowing and infinite energy that is constantly changing—creating and uncreating itself. Byron's poem mirrors this process as a way of tapping into a greater creative power, and the ideas of Carl Jung almost identically when he speaks about the process of individuation.





Synthesis and Study of Fluorinated Alkanethiols for Use in Self-Assembled Monolayers

SURF Student: Antonio Pontifes

Department: Chemistry

Faculty Mentor: T. Randall Lee



Self-assembled monolayers (SAMs) of alkanethiols compounds on gold are used to generate highly ordered and well-defined organic films. Chemical modification of the terminal group on thiol chains alters the physical properties of SAMs. For example, the addition of fluorocarbon segments to alkanethiols results in the formation of monolayers that are hydrophobic, oleophobic, and chemically and biologically inert. These properties are due to the strength of the carbon-fluorine bond, as well as the helical nature of the fluorocarbon chain. To gain more insight on fluorinated SAMs, a model substrate was synthesized. This substrate will be one of ten substrates of varying fluorination that will be used to examine the lattice structure of SAMs. Spectroscopy of the intermediate products shows a high degree of purity with minimal side products.



Patterned Surfaces of Conducting Polymers via Colloidal Templated Electropolymerization

SURF Student: Kyle Potts

Department: Chemistry

Faculty Mentor: Rigoberto Advincula



Colloidal templating involves the assembly of ordered colloidal crystals (called opals) that serve as sacrificial templates for structuring macroporous inverse colloidal crystals (called inverse opals or triangular arrays). Colloidal templated surfaces have a wide range of potential applications such as photonic crystals, superhydrophobic surfaces, and drug delivery. The goal of our project was to fabricate a well-defined 2-D patterned surface of conducting polymers using template-assisted electropolymerization. In order to produce the well-defined 2-D surface we first deposited a monolayer of polystyrene. Next, we electrodeposited conducting polymers (polyvinylcarbazole, terthiophene, and TEG-G1 Cbz) onto the surface. Finally, we removed the polystyrene template. We characterized the surface morphology using atomic force microscopy (AFM). In conclusion, we successfully fabricated a highly ordered monolayer array of conducting polymer inverse colloidal crystals by template-assisted electropolymerization. This novel approach provides several advantages over the more complex and expensive lithographic techniques.

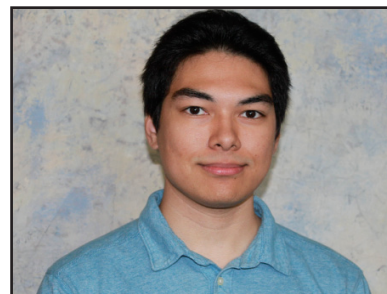
An Approximation Technique for Complex Non-Linear Networks

SURF Student: Killian Ryan

Department: Physics

Faculty Mentor: Gemunu Gunaratne

Complex diseases such as cancer or diabetes are controlled by underlying gene networks. Previous therapies aimed to extremely modify single genes may sufficiently alter other genes in the network and possibly compound sources of problems. Inadvertently, this is the origin of side-effects induced by many drugs and the failure of most single target drugs. The design of an effective, multi-target therapy requires a strategy to study the network in its entirety. Our group has introduced such an approach, which we wish to test on complex electrical networks. We choose circuit networks for their cost effectiveness, ease of construction, and speed of experimentation which allows for an accessible way to study the effectiveness of the methodology; and the results thus far are admirable.



The Development of an Academic-Community Partnership to Combat the Obesity Epidemic

SURF Student: Iman Sahnoun

Department: Health and Human Performance

Faculty Mentor: Rebecca Lee

African Americans (AA) and Hispanics or Latinos (HL) have the highest prevalence of obesity. Community-based participatory research (CBPR) is an innovative method which can be used to address this problem. The purpose of this project was to document the methodology used in the Science & Community: Ending Obesity Improving Health (1U13HD063190) project to develop an academic-community partnership in Houston. Community members and groups were invited to Science & Community meetings in order to gain a broad representation of the community. Partners were invited to networking events and promoted their organizations through monthly and quarterly newsletters and internet-based media. Two hundred and three emails were sent inviting people/organizations to join the Partnership. Through outreach, 62 partners (N=16 men, 46 women, 40 AA, 7 HL) attended Opportunity Receptions and Symposia. Academic-community partnerships foster open communication, trust, and keep participants engaged from conceptualization to implementation. The methodology used by Science & Community can direct future efforts to treating obesity using CBPR.





Queering Ireland: Psychological and Cultural Similarities between LGBT Irish and American Literature

SURF Student: Jonathan Sanford

College and Department: Honors College and English

Faculty Mentors: Robert Cremins and Margot Backus



Beginning in the late nineteenth century and progressing through to today, LGBT Irish literature and writers have contributed literary innovations in writing style, form, and content. Through analysis of LGBT Irish literature and exploration of psychological and cultural similarities between LGBT Irish and American communities, this project has examined how Irish literature with LGBT and gender identity themes continues to influence American and other international writers. Perhaps the most important aspect of this project was the visit to Ireland. The Irish culture and community set the backdrop for the project; learning about Ireland's troubled society served as an explanation of the literature's deeply psychological content, as well as extrapolation on previously unspoken topics. Through research in conjunction with the trip to Ireland, several links were made with American and other international literature. The rise of modernism in particular assisted this prominence of Irish literature. The perfection of innovations such as stream-of-consciousness technique as well as the examination of the self served as a foundation for experimentation undertaken by American and Irish writers alike. LGBT Irish literature has assisted other writers around the world in revolutionary writing techniques. Irish writers continue to serve as groundbreaking examples of literature across the world.



On the Educative Limits of Law at Sparta

SURF Student: Andy Sapp

Department: Political Science, *Phronesis* Program

Faculty Mentor: Susan Collins



Ancient Sparta, by instituting an historically unique system of education, trained its citizens in virtue from birth to death. Its ostensible aim was the creation of the most virtuous citizen: one truly free and devoted to the good of the community. But it is not clear whether Sparta's education instilled virtue in its citizens or whether it simply made virtuous behavior a political norm. To settle this issue, I turn to the works of Xenophon, a political thinker who witnessed this education first hand. I compare Xenophon's account of the Spartan regime to his account of an ideal regime in which the instilling of virtue is the chief concern of education. Through this comparison, I try to elucidate the relationship between virtue and Sparta's education system. I conclude that Sparta's training in virtue was designed to create a cohesive society but not necessarily to instill true virtue in its citizens.

The Function of a Novel Presynaptic Ethanol Receptor in Alcohol Self-Administration in *Drosophila melanogaster*

SURF Student: Vrutant Shah

Department: Biology and Biochemistry

Faculty Mentor: Gregg Roman

Ethanol binding proteins are extremely attractive targets for rational drug development to treat alcohol abuse and addiction. Unc-13 has been shown by the Das Lab (College of Pharmacy, University of Houston) to bind alcohol at a high affinity. Unc13 is a highly conserved presynaptic protein required for neurotransmitter release and hence has the potential to be a very significant affecter of alcohol's actions in the nervous system. Herein, we examined the functional consequences of reducing Unc13 on ethanol self-administration in *Drosophila melanogaster*. Interestingly, the reduction of *dunc13* in heterozygotes for a loss-of-function mutation resulted in an significant increase in the preference for alcohol containing food. In contrast, expressing a *dunc13* RNAi transgene resulted in a significant decrease in ethanol preference. Although the impact of this RNAi expression on *dunc13* levels is currently unknown, our data suggest that Unc13 levels can significantly modulate alcohol self-administration in a powerful genetic model system.



Determining the Provenance of Himalayan Muscovite Grains through Sr and Rb Isotopic Analysis

SURF Student: Jeremy Slaugenwhite

Department: Earth and Atmospheric Science

Faculty Mentor: Peter Copeland

When examining the tectonic history of the Himalayan mountain range, fundamental questions arise: How, exactly, have they grown over time? Do disparate regions have a common history, or their own unique story? As the Himalayas are the type-example of continental collisions, the answer to these questions can be applied to other mountain building events. Already approximately 200 sedimentary muscovite grains from each of two modern river systems in Nepal have been dated, providing information on when each of the grains was last at a depth of approximately 12km. $^{87}\text{Sr}/^{86}\text{Sr}$ ratios obtained through mass spectrometry can be used to determine whether grains with the same cooling age come from the same place or many places. If similarly-aged muscovites were found to have wide-ranging $^{87}\text{Sr}/^{86}\text{Sr}$ values, the entire drainage basin was acting as a single tectonic unit during the time in question; a narrow range will indicate a smaller region.



Synthesis of Poly-heterocyclic Organic Molecules for PKR Inhibition



SURF Student: Patrick Timmons

Department: Chemistry

Faculty Mentor: Jeremy May

Based on previous research*, we have altered a molecule known to inhibit Protein Kinase RNA-activated (PKR) in an attempt to increase potential inhibition. We have an interest in inhibiting PKR because previous studies and our collaborators suggest it may have a hand in cognition. Successful PKR inhibition may result in improved long-term memory. This research project has focused on a range of molecules that may meet our goal by transforming two important heterocycles. By developing a general synthesis for the creation of these PKR inhibiting compounds, we can create a near limitless number of samples to test. As troublesome cases continue to present themselves we are able to alter, or introduce completely new, methods in order to create what may very well be the best PKR inhibitor. **publication included on disc. The reference for this publication will be included on an additional handout for UR day.*



Classifying Patterns of Electroencephalography (EEG) Recordings to Predict Epileptic Seizure



SURF Student: Minh Tran

Department: Industrial Engineering

Faculty Mentor: Erhun Kundakcioglu

Epilepsy is a brain disorder involving repeated, spontaneous seizures of any type. Worldwide one hundred million people suffer from a seizure at some time in their lives. These seizures can be developed unexpectedly without an immediate cause. Although not fatal, the major importance of the problem lies on the fact that the patients with a brain disorder tend to live longer than patients with a serious disease such as cancer, implying a potentially larger impact. The purpose of this research is to obtain a reliable classification of seizure vs. non-seizure EEG recordings, so that upcoming seizures can be predicted. The procedure is described as follows: One hour recordings of raw ictal data and one hour recordings of raw interictal data (~4000 recordings in total) are randomly selected. Next, peak detection method is applied to introduce additional features. The preprocessed data is scaled for increased robustness. Finally, the Support Vector Machine (SVM) classifier is built using the processed data. The model is validated using the complete data set. The outcome shows that SVM with peak detection provided best result with highest average accuracy percentage (85%) and lowest running time (1 hour), compared to raw data and data without peak detection.



Virtualization of 3D Graphics on a Computer Cloud

SURF Student: Justin Wang

Department: Computer Science

Faculty Mentor: Larry Shi

Cloud computing has become an integral part to business models of large technology companies and to the efficiency of daily functions we handle online. As cloud computing continues to be developed, the features provided are expanding in both power and capability. Research in the Virtualization of Cloud Computers for Real Time Interaction with 3D Graphics seeks to further develop the capabilities of cloud computers. Currently cloud computers are best used for less complex processes that do not require a limitation on time. This project tests the feasibility of real time interaction, essentially the ability to send an input and receive the correct output without a delay distinguishable to the human mind, with 3D graphics. 3D graphics makes the project interesting because it requires the hardware virtualization of the cloud as well as the compression of large amounts of data to efficiently transfer over the internet. If the project is able to be realized, cloud computing could become a viable option for nearly anything that requires a computer.



Stress & Obesity in Under-Resourced Women in Houston, Texas

SURF Student: Sandra Wang

Center: Abramson Center for the Future of Health

Faculty Mentor: Courtney Queen

Problem Statement: Obesity is a condition of excess accumulation of body fat resulting in the increased risk of diabetes, heart disease and increased complications ultimately resulting in disability or death. **Causes of obesity** range from predictors involving genetics, lack of exercise, diet and nutrition, culture, and psychosocial stress. **Theoretical Framework:** The theoretical framework for this study utilizes an allostatic load logic model to better understand the relationship between stress and obesity. **Methods:** This study utilizes a mixed-methods approach to sample 50 women from 10 racially and ethnically diverse centers in Houston, Texas. **Findings:** The anticipated findings of this study reveal a strong relationship between stress and obesity and indicate the need to focus on coping mechanisms and stress management to mitigate the affects of stress on weight gain. **Conclusions:** Findings from this study support the development of culturally specific health promotion materials for managing stress and weight.



SURF 2011 STUDENTS IN **ACTION**



SURF 2011 LECTURERS

Jeremy Bailey

Jeremy Bailey joined the University of Houston in 2007 and holds a dual appointment in the Department of Political Science and The Honors College. He teaches The Human Situation and American Political Thought and participates in *Phronesis: The Program on Politics and Ethics*. He is the author of *Thomas Jefferson and Executive Power* (Cambridge University Press, 2007). His research has also been published in journals including *American Political Science Review*, *Review of Politics*, *Harvard Journal of Law and Public Policy*, and *Political Research Quarterly*. Bailey is now working on democratic theories of executive power, as well as a project on James Madison and the problem of public opinion. *Dr. Bailey participated on the SURF faculty panel on applying to professional and graduate school.*



P. Shiv Halasyamani

Dr. P. Shiv Halasyamani is a Professor in the Department of Chemistry at the University of Houston. Dr. Halasyamani teaches a wide range of courses, such as chemistry for honors freshman, descriptive inorganic chemistry for undergraduates, and solid state chemistry for graduate students. His research focuses on the synthesis and characterization of new oxide and halide materials with technologically important properties. Throughout his career, he has received many accolades, such as the NSF Early Faculty CAREER Award, the ACS Petroleum Research Fund Type G and AC Grants, and the Beckman Young Investigators Fellowship. He received his B.S. at the University of Chicago, his Ph.D. at Northwestern University, and was a Postdoctoral Fellow and Junior Research Fellow at Oxford University before arriving at the University of Houston. *Dr. Halasyamani lectured on research ethics this past summer to the SURF participants.*



Stephan Hillerbrand

Stephan Hillerbrand is an Assistant Professor of Photography and Digital Media in the School of Art. Professor Hillerbrand is a remarkably accomplished artist who has exhibited his work all around the world. He is a strong mentor to his students and encourages them to show their work to the community, enabling them to be more successful artists and professionals upon graduation. Professor Hillerbrand is also a recipient of the Ross M. Lence Award in Performing and Visual Arts and a Fulbright American Scholar. *He conducted a lecture on his digital media projects in photography and the research and inspiration behind his works for the SURF participants.*



SURF 2011 LECTURERS

Katherine Etchison

Katherine Etchison is a Career Counselor at the University Career Services office at University of Houston. She provides career counseling to students in the Colleges of Liberal Arts and Social Sciences, Education, and Social Work. She also co-manages Pre-Law Advising for students considering law school. Katherine holds a B.S. in Interdisciplinary Studies from Texas A&M University and an M.Ed. in Counseling from University of Houston. She taught middle school math for three years before getting her Master's in Counseling. *Katherine conducted a SURF lecture on developing an effective personal essay and curriculum vitae.*



Donna Kacmar

Donna Kacmar is an Associate Professor and Technology Coordinator at the Gerald D. Hines College of Architecture where she is also the director of the Materials Research Collaborative. She is a registered architect, LEED AP and earned both a Master of Architecture and Bachelor of Environmental Design from Texas A&M University. *Kacmar led the SURF students through the research facilities in the Gerald D. Hines College of Architecture in July.*



T. Randall Lee

Dr. T. Randall Lee is a Cullen Distinguished Professor and Associate Department Chair in the Department of Chemistry. Lee's research focuses on various aspects of nanotechnology, with an emphasis on the synthesis, characterization, and utilization of new types of nanomaterials for electronic and biological applications. Since much of the work in the Lee group is collaborative in nature, students often have the good fortune of working side-by-side with chemical engineers, physicists, electrical engineers, biochemists, and biomedical engineers.

Dr. Lee is the inaugural recipient of the Office of Undergraduate Research's Faculty Award for Mentoring Undergraduate Research, and also a recipient of the HAO Outstanding Faculty Award, University of Houston Research Excellence Award, Enron Teaching Excellence Award, NSF CAREER Award, and the Camille and Henry Dreyfus New Faculty Award. *Dr. Lee led the SURF students through a tour of his lab facilities this past June.*



SURF 2011 LECTURERS

Michelle Miley

Michelle Miley holds a B.A. in English and Psychology and an M.A. in English Literature from Baylor University. As the Assistant Director of Writing in the Disciplines at the University of Houston Writing Center, Michelle partners with professors across the university to teach writing within their courses. Her research interests include the use of small writing groups as a methodology for developing both better writing and better thinking. Michelle is currently working on her Ph.D. in Rhetoric, Composition and Pedagogy from the University of Houston. She has taught freshman and sophomore composition classes at Baylor University, Lubbock Christian University and Wayland Baptist University, and has coordinated and taught in the XL: Strategies for Learning program at Texas Tech University. *This past summer, Michelle conducted a lecture for the SURF students on learning the language of their disciplines.*



Anna P. Newman

Dr. Anna Newman is a geneticist who has studied protein secretion in the yeast *S. cerevisiae* and the development of the nematode *C. elegans*. In *C. elegans*, she discovered cell-cell interactions that occur during uterine development and characterized genes required for these processes. She performed her undergraduate studies at Harvard and received a Ph.D. in Cell Biology from Yale. She is the coauthor of over 20 research articles as well as of scientific review articles. Her work has been published in journals including *Nature*, *Genetics*, *Development*, and the *Journal of Cell Biology*.

She has taught and mentored students at the high school, undergraduate, and graduate levels. At the University of Houston, she teaches Introductory Biology, Genetics, and Interpreting Experimental Biology. She also organizes the Colloquium for Undergraduate Research in Biology, which provides students with a forum in which to present their research results. *Dr. Newman participated on the SURF faculty panel on applying to professional and graduate school.*



SURF 2011 LECTURERS

Kathryn Peek

As AVP for University Health Initiatives, Dr. Peek is charged with overseeing health-related education, research, and community outreach. She is also assisting with the development of the UH System Health Academic Master Plan.

Before joining UH in 2009, Peek served as associate professor in the Department of Imaging Physics, University of Texas MD Anderson Cancer Center and adjunct associate professor, Department of Bioengineering, Rice University. She has also held faculty and administrative positions at the University of Texas Medical School at Houston and the University of Houston College of Optometry. In 2002, Peek co-founded and served as first president for the Texas Medical Center Women's Health Network, an organization of more than 600 local health professionals. She has won numerous teaching awards and lectures extensively about health and education issues through out the country. *Dr. Peek participated on the SURF faculty panel on applying to professional and graduate school.*



Hanadi S. Rifai

Dr. Hanadi Rifai is a Professor in the Civil and Environmental Engineering Department at the University of Houston. Her expertise includes ground water flow and transport modeling, risk assessment, natural attenuation, hazardous waste, hydrology, urban storm water quality, non-point source pollution, Total Maximum Daily Loads, Decision Support Systems and Geographic Information Systems. In addition to authoring the widely-used BIOPLUME II, BIOPLUME III and BIOPLUME IV computer models for biodegradation and natural attenuation modeling, Dr. Rifai has built and manages the GIS (Geographical Information Systems) computer laboratory in the department. She also teaches professional courses on groundwater contaminant transport, remediation and groundwater modeling, natural attenuation, and risk assessment. *Dr. Rifai conducted a lecture on pollutants in the Houston Ship Channel for the SURF participants.*



Kathy Zerda

Dr. Kathy Zerda is the Director of the Program for Mastery in Engineering Studies (PROMES), an engineering excellence program at the Cullen College of Engineering. Before arriving to the University of Houston, Dr. Zerda worked as an Engineering Manager at Compaq Computer Corp and Hewlett-Packard Company for nine years. She has her M.B.A. from Mays Business School at Texas A&M, her Ph.D. from Baylor College of Medicine, and her B.S. from University of Notre Dame. *This past summer, Dr. Zerda participated on the faculty panel for applying to professional and graduate school.*



PRESENTING UNDERGRADUATE RESEARCHERS

Short-Film Interventions for the Early Detection of Buruli Ulcer Disease in Ghana and Côte d' Ivoire

Student Researcher: Amber Alaniz-Owens

Faculty Mentor: Courtney Queen

Center: Abramson Center for the Future of Health

Validation of Flow Cytometry to Measure PBMC Activity Following 30-min of Exercise

Student Researcher: Christopher Anzures

Faculty Mentor: Brian McFarlin

Department: Health and Human Performance

Conservation Task Performances Among Monolingual and Bilingual Children

Student Researcher: Sonia Babu

Faculty Mentor: Hanako Yoshida

Department: Psychology

Depression and Commitment in Romantic Relationships: A Between and Within Dyads Analysis

Student Researcher: Jessica Balderas

Faculty Mentors: Robert Wickham and Linda Acitelli

Department: Psychology

PRESENTING UNDERGRADUATE RESEARCHERS

The Sculpture: “Jerusalem Gate”

Student Researcher: Joe Battle

Faculty Mentor: Abinadi Meza

Department: Art

Synthesis and Characterization of $\text{Cu}_5\text{V}_2\text{O}_{10} \cdot \text{CuCl}_2$

Student Researcher: Mathieu Bosch

Faculty Mentor: Angela Moeller

Department: Chemistry

Visualization and Analysis of Neurites

Student Researcher: Audrey Cheong

Faculty Mentor: Badrinath Roysam

Department: Electrical and Computer Engineering

Rigid M Shaped Jumper Analysis with Interacting Internal Flow

Student Researcher: Leonardo Chica

Faculty Mentor: Raresh Pascali

Department: Engineering Technology

Supplementing Infrequent Data with Geovisualization Tools to
Evaluate Reservoir Sedimentation for Searsville Lake

Student Researcher: Yanet Cuddus

Stanford Faculty Mentor: David Freyberg; UH Faculty Mentor: Julia Wellner

Department: Earth and Atmospheric Science

PRESENTING UNDERGRADUATE RESEARCHERS

Implications of NF- κ B and Toll-Like Receptor 2 (TLR2) in the Promotion of Lung Cancer by COPD-Like Inflammation in a Mouse Model

Student Researcher: Diana Del Bosque

Faculty Mentor: Seyed Moghaddam

Center: University of Texas MD Anderson Cancer Center

Epistasis Influencing Regulations of the Lac Operon During Adaptation of *Escherichia coli* Population

Student Researcher: Trang Duong

Faculty Mentor: Tim Cooper

Department: Biology and Biochemistry

Enhancement of an Oncolytic Virus by the Insertion of a Secretable Form of Activated Granzyme B

Student Researcher: Guillermo Duran

Faculty Mentor: Xiaoliu Zhang

Department: Biology and Biochemistry

Geiseric and Huneric: The Venture for Sovereignty and the Start of Demise in Vandal North Africa

Student Researcher: Michael Geronimo

Faculty Mentor: Sally Vaughn

Department: History

PRESENTING UNDERGRADUATE RESEARCHERS

A River Runs Through It: The Wallisville Saltwater Barrier Project

Student Researcher: Justin Ross Glover

Faculty Mentors: John Britt, Lee College and Jeffrey Lash, UH Clear Lake

Department: Earth and Atmospheric Sciences

Green UH: Creating and Sustaining Recycling at the University of Houston

Student Researcher: Bethel Glumac

Faculty Mentors: Emily Messa and Daniel Price

Department: University Services

Who Supports Hezbollah?

Student Researcher: Manar Hindi

Faculty Mentor: Ryan Kennedy

Department: Political Science

Defects of PbTe Crystals as Determined by Laue Diffraction

Student Researchers: JD Kelley and Amol Vaidya

Faculty Mentor: Rebecca Forrest

Department: Physics

Attachment Representation in Borderline Personality Disorder Females:
A Qualitative Analysis

Student Researcher: Robyn Kenkel-Mikelonis

Faculty Mentor: Carla Sharp

Department: Psychology

PRESENTING UNDERGRADUATE RESEARCHERS

Ultra-Sensitive Detection of Protein Biomarkers Using Immuno-Magnetic Particles

Student Researcher: Yubitza Lopez

Faculty Mentor: Richard Willson

Department: Chemical and Biomolecular Engineering

Evaluation of Aortic Elastic Fiber Network Damage

Student Researcher: Mohamed Mohamed

Faculty Mentor: John Eberth

Department: Engineering Technology

Mechanical Properties of Extra-Cellular-Matrix Mimetic Polymers

Student Researcher: Duy Trac Nguyen

Faculty Mentor: John Eberth

Department: Engineering Technology

What Are You Wearing? A Review of
Sustainable Practices in the Modern Wardrobe

Student Researcher: Sarah Nielsen

Faculty Mentor: Kimberly Meyer

Program: Center for Creative Work

Regulation of the Central Cholesterol Pathway in an Animal Model of Autism

Student Researcher: Annie Pally

Faculty Mentor: Maria Tejada-Simon

Department: Pharmacological and Pharmaceutical Sciences

PRESENTING UNDERGRADUATE RESEARCHERS

Order Effects in Novel Word Learning: Implications for Bilingualism

Student Researcher: Hannah Parham

Faculty Mentor: Hanako Yoshida

Department: Psychology

What the Human Brain Determines is the Line of Best Fit

Student Researcher: Jasmine Patel

Faculty Mentor: Bhavin Sheth

Department: Electrical and Computer Engineering

Biofunctionalization of Silicone Polymers using poly(amidoamine) Dendrimers and a Mannose Derivative for Prolonged Interference against Pathogen Colonization

Student Researcher: Megan Planas

Faculty Mentor: Chengzhi Cai

Department: Chemistry

Muscle Performance Assessed by Local and Systemic Biosignals: A Validation Study

Student Researcher: Karishma Prasad

Faculty Mentor: Luca Pollonini

Center: Abramson Center for the Future of Health

Normalization of β -Adrenergic Receptor Signaling in Gravin Knockout Mice with Heart Failure

Student Researcher: Muhammad Siddiqui

Faculty Mentor: Bradley McConnell

Department: Pharmacological and Pharmaceutical Sciences

PRESENTING UNDERGRADUATE RESEARCHERS

Food Allergen Awareness Survey

Student Researcher: Michaela Supkis

Faculty Mentor: Jay Neal

Department: Hotel and Restaurant Management

Conversion of Fibroblasts into Cardiac Progenitors

Student Researcher: Dasha Tikhomirova

Faculty Mentor: Robert Schwartz

Department and Institute: Biology and Biochemistry and Texas Heart Institute

Bipolar Disorder 101: Describing and Talking about Bipolar Disorder in College

Student Researcher: Sarah Turner

Faculty Mentor: Susan Nash

Department: Psychology

Trapped Field Enhancement in High Temperature Superconducting Yttrium Barium Copper Oxide Magnets with Nano Diamond Dopant

Student Researcher: Tristan Walker

Faculty Mentor: Roy Weinstein

Department: Physics

PRESENTING UNDERGRADUATE RESEARCHERS

Photogrammetry & 3-D Point Cloud Applications for Education and Construction Management

Student Researcher: Mark Weishuhn

Faculty Mentor: Lingguang Song

Department: Construction Management

Africana Education from Kindergarten to College

Student Researcher: Courtney Wyatt

Faculty Mentor: Kameelah Samuel

Departments: African American Studies and English

The Role of G-Protein Coupled Receptor Kinases in Modulating the Sedation Effects of Alcohol in *Drosophila Melanogaster*

Student Researcher: Sally Ziatabar

Faculty Mentor: Gregg Roman

Department: Biology and Biochemistry

ELET 4208/INDS 4500 SENIOR PROJECT CLASS

Fall 2011 Project Groups

CET Advisor: Farrokh Attarzadeh, ID Advisor: EunSook Kwon

Team 1: Carbon Dioxide Monitoring System

CET Students

Minela Bajrovic

Nydia Janet Segura-Reyna

Luis Alberto Garcia

Jason Anthony Gibb

ID Students

Aide Gutierrez

Ryan Anthony Pursel

Team 8: Automatic Temperature Adjuster

CET Students

Dustin Matthew Williams

Marcus A. Land

Ruochen Xin

Jordan Alan Smith

ID Students

Kellee Marie Kimbro

Umbelina Cantu

Juan Ernesto Jimenez

Team 3: MyVoice

CET Students

Jose Gonzalez

Jeffrey Seto

Alan Tran

Anthony Tran

ID Students

Sergio Aleman

Ya-Han Chen

Rick Salinas

Team 12: eFridge

CET Students

Sandra E. Omoruyi

David Gonzalez

Aaron J. Schafbuch

ID Students

Anna Ho

Sehyoung Hamjong

Team 7: Smart Tracking Intuitive Cane

CET Students

Joaho Wilfredo Zamora

Francisco J. Martinez

Yanelli Alcantar

Brenda Gonzalez

ID Students

Meredith Tucker

Thi Vu

Jawad Hasan

HOW TO GET STARTED CONDUCTING RESEARCH

All of the programs offered by the Office of Undergraduate Research require that students secure a faculty member with whom they would like to conduct research with before applying to one of the programs. This leads many students wondering how they should initiate the process. Here are a few tips on how to secure a research opportunity at the University of Houston:

- Peruse your department's website to find out about the research the faculty within your discipline are conducting.
- Talk to current and past professors (during their office hours) from courses you have excelled in and have enjoyed. Even if the professor is not currently seeking an undergraduate researcher, he or she may know of a colleague that is seeking an undergraduate research assistant.
- Consult an academic advisor from your department to inquire about faculty members currently conducting research in your discipline.
- Check OUR web page of faculty members currently seeking undergraduate researchers, www.undergraduateresearch.uh.edu/facultyresearch.html. Also, create an account on **eDISCOVERY** to find additional available research opportunities.
- Join the UH Undergraduate Research **Facebook** fan page. You will receive weekly updates on available research positions and scholarships for undergraduates.
- Join **HURN**, the student organization for undergraduate research. This will allow you to connect and network with other UH undergraduate researchers.

The Provost's Undergraduate Research Scholarship (PURS) is a part-time semester research program for juniors and seniors, and awards a \$1,000 scholarship to work one-on-one with a faculty mentor. This scholarship is open to students from all colleges and disciplines. Candidates must have at least a 3.0 grade point average to apply. For more information and to view the online application, visit the PURS website at www.undergraduateresearch.uh.edu/purs.html.

The Summer Undergraduate Research Fellowship (SURF) program is a full-time, 10-week summer research program, open to all continuing students, that provides a \$3500 stipend to conduct research under the mentorship of a UH faculty member. The projects run the gamut from analyzing texts in the library, to conducting fieldwork, to experimenting with specimens in laboratories. Students from all disciplines are encouraged to apply. The deadline for SURF is in the middle of March each year. For more information and to view the online application, visit the SURF website at www.undergraduateresearch.uh.edu/surf.html.

The Senior Honors Thesis is a capstone program that serves as the pinnacle of the student's undergraduate career in research. Student participants enroll in 3399H and 4399H, a total of six hours of coursework, which is typically applied toward their major degree requirements in their senior year. Before the start of the semester, the student secures a thesis director that serves as the instructor of record and mentor of the project. A second reader and Honors reader also serve on the student's thesis committee, offering advice during the research and writing process as well as at the student's defense of the thesis. Many students cite the thesis project as the highlight of their experience as an undergraduate. For more information, please visit the thesis website at www.undergraduateresearch.uh.edu/thesis_guidelines.htm.

NATIONALLY COMPETITIVE SCHOLARSHIPS

The Honors College and The Office of Undergraduate Research assist students in finding and applying for nationally competitive scholarships. Nationally competitive scholarships are awards that require university endorsement to apply. Contact Karen Weber, kweber@uh.edu, or Dr. Stuart Long, long@uh.edu, for more information. A more detailed listing of competitive awards can be found at www.undergraduateresearch.uh.edu. Among these scholarships are the following:

RHODES SCHOLARSHIPS

The Rhodes Trust awards 32 scholarships each year to American students for study at Oxford for 2-3 years. The Rhodes Scholarship covers tuition and all other educational costs for the scholars' tenure at Oxford. Applicants must be full-time graduating seniors that have at least a 3.75 GPA, demonstrate strong leadership abilities, and possess a strong sense of social purpose. Candidates should also be U.S. citizens, unmarried, under the age of 24, and have attained a bachelor's degree before beginning their first term at Oxford. The deadline is in the beginning of October each year, but interested candidates should contact the Office of Undergraduate Research no later than the end of the spring semester of their junior year.

MARSHALL SCHOLARSHIPS

The Marshall Foundation offers 40 awards each year for one or two years of study at any university in the United Kingdom. The Marshall Scholarship covers tuition, cost of living expenses, travel expenses, and other academic fees. Candidates should be graduating seniors with at least a 3.75 GPA, U.S. citizens, demonstrate strong leadership abilities and a commitment to public service, and have a clear rationale for studying in the United Kingdom. The deadline is in the beginning of October of each year, but interested candidates should contact the Office of Undergraduate Research no later than the end of the spring semester of their junior year.

ROTARY AMBASSADORIAL SCHOLARSHIPS

The Rotary Ambassadorial Scholarship awards \$13,000-\$25,000 to fund at least one year of a study abroad program and the costs associated with the program. The purpose of the scholarship is to further international understanding and friendly relations among people of different countries. The deadline is over a year before the period of study would begin. All applicants must be citizens of a country in which there are Rotary clubs. The deadline for the Rotary Ambassadorial Scholarship is at the beginning of February each year.

GOLDWATER SCHOLARSHIPS

The Barry Goldwater scholarship funds up to \$7,500 each year to sophomores and juniors interested in pursuing a research career in math, science or engineering. Candidates must have at least a 3.75 GPA, be U.S. citizens or permanent residents, and have demonstrated research experience. The national deadline is at the end of January each year, but the campus deadline is in November. Interested candidates should contact the Office of Undergraduate Research before the campus deadline.

FULBRIGHT GRANTS AND TEACHING ASSISTANTSHIPS

The Fulbright funds all expenses for a one-year research grant or graduate study in over 140 countries. Fulbright teaching assistantships are also available in a variety of different regions. Candidates must be U.S. citizens and have a bachelor's degree by the time they begin their project overseas. The Fulbright deadline is in the middle of October each year, but the campus deadline is typically about a month before the national deadline. Interested candidates should contact the Office of Undergraduate Discovery Programs.

UH LEARNING THROUGH DISCOVERY

Transforming the Undergraduate Experience through Research

The *Learning through Discovery Initiative* is the University of Houston's comprehensive Quality Enhancement Plan (QEP). The five-year initiative promotes a teaching and learning culture supportive of research in all disciplines for all undergraduate students. The initiative focuses on 1) providing research skills training and 2) expanding student research opportunities both on and off campus. Research skills and experience will equip our talented and diverse students with the valuable tools they need to compete in the global marketplace or as they pursue graduate studies.



Photo by Lacy/Shea (UH)

Discovery Resources and Programs

Students will benefit from a host of new programs and resources such as:

- Discovery Workshops & Tutorials – introductory research skills training via in-person workshops or online tutorials
- eDISCOVERY – an online portal connecting students to research opportunities and mentors
- Reality Chats – in person and online chats with alumni and mentors about their career paths and research experiences in industry, academia, etc.
- Research Dissemination - support for student showcases in departments and colleges, prizes for Undergraduate Research Day, the Posters on the Hill Travel Award, and Undergraduate Research Travel Fellowships for student research presentations at national conferences
- Research-Supportive Curriculum – a QEP Curriculum Development Grant Program provides support for enhancements to existing courses or development of new courses that incorporate inquiry-based learning or research training

For more information and to see how you can become involved, please visit www.uh.edu/discovery.

THE HONORS COLLEGE

The Honors College Philosophy

The Honors College at the University of Houston serves the intellectual needs of gifted undergraduates in more than 100 fields of study. We provide the careful guidance, flexibility, and personal instruction that nurture excellence. For the students who join us each fall, we offer the community and advantages of a small college together with the resources and rich diversity of a large university. Our faculty and staff believe that a university education should offer more than the acquisition of skills for the workplace and the Honors College challenges the University's finest students to develop the attributes of mind and character that enhance all facets of life.

The Honors College Community

Special Classes and Course Selection

We draw on the talents of the finest faculty members within the University to provide a wide range of special courses with limited enrollment. Honors courses encourage student participation, interaction, and discussion.

Membership in a Community

You will enjoy special privileges, including the Honors College scholarships, priority registration, computer facilities, reserved lounge and study areas, study abroad opportunities, and special housing in the Honors College residence halls. Many intangible benefits also come with participation in the Honors community—the friendships that develop in the classroom carry over into other areas of student life. We foster an atmosphere of collegiality and a spirit of camaraderie through informal gatherings, social activities, and on- and off-campus cultural events.

Talented Classmates

When admitted to the Honors College, you will enter the company of the most academically talented undergraduates at the university. Members bring a variety of interests, aptitudes, and ambitions to their studies. Through daily association with other Honors students, you will discover the broad range of academic programs at the University.

Honors Curriculum

Our curriculum compliments all majors/degree plans offered at the University of Houston. You will fulfill many of your university core requirements through Honors courses that take the place of regular required classes. One key sequence of courses, The Human Situation, is team-taught by Honors faculty and is designed to ensure that you are introduced to the great books of the Western tradition. For many Honors students, the Senior Honors Thesis represents the exciting culmination of a bachelor's degree. A thesis provides an excellent opportunity for you to work under the direction of faculty in your chosen field of study, applying your skills and knowledge toward the completion of a scholarly project.



PHRONESIS: A PROGRAM IN POLITICS AND ETHICS

“What is justice?”

“What is justice?” asked Socrates, the self-described “gadfly” of ancient Athens. For centuries, great thinkers from Plato and Aristotle to Machiavelli and Nietzsche have addressed such fundamental questions as the nature of war and peace, the relation between freedom and authority, and the origins of moral and political order. Reflecting on our own American experience, writers and political actors such as Jefferson, Hamilton, and Madison call us to consider the character of democracy, the grounds of liberal constitutionalism and the problems and promise of a free society. In the long course of intellectual history, these and other thinkers have taken up the issues of gender, the family, religion, commerce, and science, and, like the gadfly of Athens, urged us to reflect on the fundamental question of the human good.



Questions such as these are the focus of a program in Politics and Ethics established by the Honors College in collaboration with the College of Liberal Arts and Social Sciences. The program’s name, *Phronesis*, is the Greek word for prudence or practical wisdom, the quality that distinguishes good citizens and political leaders.

Students who participate in *Phronesis* are a part of a vibrant intellectual community engaged with some of the most profound and enduring questions of human life as well as central and current topics in politics and ethics. The program is housed in the Honors College as an interdisciplinary minor, established with the cooperation of faculty in Political Science, Philosophy, and Classical Studies. The curriculum draws on the foundation provided by “The Human Situation,” the year-long intellectual history course required of all Honors freshmen. Students of any major can then choose from a variety of courses in political theory, philosophy, and classics. Representative offerings include “Liberalism and its Critics,” “Law, Society, and Morality,” “History of Ancient Philosophy,” “The Roman Republic,” and “Recent Islamic Political Thought.” In addition to course offerings that draw on the expertise of faculty across disciplinary boundaries, *Phronesis* also hosts public events that engage the wider University and community.



Contact Information:

Susan Collins, Director suecoll724@uh.edu
Krystafer H. Redden, Student Assistant phronesis.politicsandethics@gmail.com
Andy Little, Advisor alittle@uh.edu

MEDICINE & SOCIETY

The Medicine & Society Program

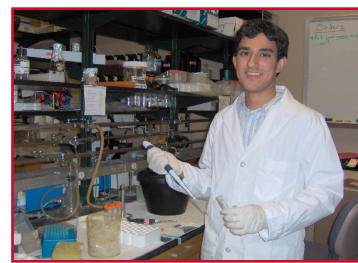
Houston is a city in which health care is an industry of immense importance historically, economically and culturally. Founded in 1941, the Texas Medical Center has grown to be amongst the largest in the world. It is home to three medical schools, five schools of nursing, and a score of programs in the allied health sciences, as well as a dozen major hospitals, clinics, research laboratories, and other medical facilities.

Despite this prestigious center and others within the state, Texas residents are underserved in the realm of public health. Many have little access to affordable health care, relying on frequently overburdened emergency services for their most basic medical needs. Other Texas residents that do have access find the system difficult to navigate, or even alienating in its lack of meaningful human interaction. What Texas shares with the rest of the United States is a health care system that is at one and the same time the best in the world and also fraught with problems for so many of its consumers.

With its on-site faculty expertise and its close ties to the Methodist Hospital and other institutions in the medical center, The Medicine & Society Program (est. 2005) is ideally positioned to coordinate and lead major educational projects, including academic courses, public lectures, conferences, and research collaborations directed toward greater understanding of the relationship between medicine and wider society.

If you are a student or member of the public interested in more information about The Medicine & Society Program, please contact Helen Valier, Coordinator of The Medicine & Society Program at 713-743-9021, or by email hkvalier@uh.edu.

We also welcome inquiries from organizations and groups wishing to collaborate with our members. For more information, please visit uh.edu/honors/honors-minors-programs/medicine-society-program/.



Contact Information:

William Monroe, Dean of The Honors College & Director: wmonroe@uh.edu

Helen Valier, Coordinator: hkvalier@uh.edu

Andy Little, Peoplesoft Coordinator & Academic Advisor: alittle@uh.edu

CENTER FOR CREATIVE WORK

The Center for Creative Work offers courses and programs for students interested in a critical and interdisciplinary arts environment. We provide workshops, directed studies, retreats, and signature events such as the *Dionysia* that bring together great books and creative minds.

The Center offers a Creative Work Minor that provides a multidisciplinary art-in-context program integrating creative projects, critical study, and cultural research. Beginning with the foundation course, “Poetics and Performance,” students explore creative work through the study of art, film, literature, theatre, and music in the context of culture, history, language, business, and society. The minor integrates co-curricular activities both on- and off-campus.

Partnership with various departments, disciplines, and programs is at the very heart of the Creative Work Minor. Courses in the minor include “Philosophy of Art,” “Politics, Film, and Literature,” and “Documenting the Culture of Houston.” Another course, “Artists and Their Regions,” affords students an opportunity to pursue art, dance, drama, fiction, music, videography, and poetry while reading and studying artists and authors in the geographical locale associated with their work. The class also travels to selected areas in and out of state for weeklong retreats to focus on individual creative projects and meet with other students and faculty in workshops.

The Center also unites academic study with artistic experience, both as a performer and as a spectator. During the spring, the traditional time of the *Dionysia* festival in ancient Athens, the Center for Creative Work produces and performs a newly-translated Greek tragedy or comedy. The Honors & The Arts program also creates opportunities for students to attend exhibitions, performances, readings, and film screenings throughout Houston by collaborating with organizations such as Inprint, the Cynthia Woods Mitchell Center for the Arts, The Menil Collection, and The Museum of Fine Arts Houston Film Series. Finally, many students pursuing the minor in Creative Work make the Senior Honors Thesis the culminating experience of their undergraduate careers. Particularly for those who aspire to continue their studies in graduate school, the thesis allows them to further the work that has been most exciting and rewarding. A thesis may be creative, performative, or critical, and students work closely with a faculty mentor throughout the process.



Contact Information: John Harvey, Director, jrharvey@mail.uh.edu

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- internships
- meetings and events for office's student organization, HURN
- events on and off campus

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SAVE THE DATE!



PURS Spring 2012 Application Deadline:
Friday, November 18, 2011

SURF 2012 Application Deadline:
Friday, March 23, 2012

Faculty Mentoring Award Nomination Deadline:
Monday, February 6, 2012

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