UNIVERSITY of HOUSTON

Undergraduate Research Day 2013

Thursday, October 10
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

Undergraduate Research Day

Elizabeth D. Rockwell Pavilion and the Honors College

M.D. Anderson Library

October 10, 2013

4:00 p.m.

4:00-5:00 p.m. Viewing of Student Posters

5:00-5:30 p.m. Welcome and Remarks

Rathindra N. Bose, Ph.D.
Vice Chancellor for Research and Technology Transfer,
University of Houston System
Vice President for Research and Technology Transfer,
University of Houston

Stuart Long, Ph.D.
Associate Dean of Undergraduate Research and
The Honors College, University of Houston

5:30-6:00 p.m. Awards and Continuation of Poster Viewing

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*Thank you to the **Provost's Office**, the **Division of Research**, and the **Honors College** for their generous support of the Office of Undergraduate Research.*

*And special thanks to the **Gerald D. Hines College of Architecture** for printing the posters for the event.*

Welcome

Today is the ninth annual Undergraduate Research Day at the University of Houston. At this exciting celebration, we are highlighting the achievements of our 63 Summer Undergraduate Research Fellowship (SURF) students and the 67 other students who are presenting on their research experiences at our event.

Undergraduate Research Day is an opportunity for our campus community to support mentored research activities, knowing that building relationships with professors is pivotal to students' academic and professional path. By way of example, of the first-time college students who entered UH from 2002-2007, and participated in a program offered through the Office of Undergraduate Research, approximately 92% graduated within six years. To put this statistic into perspective, the average 6-year graduation rate in Texas is approximately 49%.

It is our privilege and pleasure to encourage the efforts of our researchers, applaud the work they have accomplished in the past year, and learn more about their projects and findings. The students you are meeting today have spent months working closely with their mentors and research teams, and this event is the culmination of their hard work and collaboration with professionals and scholars in their field. Our researchers are bright, talented, dedicated students who represent our future leaders. We congratulate them on their achievements.

The SURF students presenting today also participated in our Brown Bag Lecture Series this past summer (see page 38). These seminars are a further extension of our efforts to prepare our students for the challenges they will face in graduate school and within the workforce. Our SURF participants also toured distinguished research centers on campus, learning more about what it means to be a member of a Tier One Research University.

We extend our appreciation to the Provost's Office, the Division of Research, and the Honors College for their continued support of our Office's programs. Our ability to expand and broaden the services we offer students through mentored research activities is directly dependent upon the funding we receive from these units.

Also, we thank our selection committee for the time and effort they spend reviewing the applications we receive for our scholarship and award programs. Their input and feedback enable us to refine and revise our policies and procedures, and adhere to the ever-changing needs of the UH community.

It is a pleasure to have you with us at our event today, and we are delighted that you have taken the time to offer your support to our University of Houston student researchers.

Stuart Long, Ph.D.
Associate Dean of Undergraduate Research and The Honors College
Office of Undergraduate Research

Professor of Electrical and Computer Engineering

Karen Weber
Program Director
Office of Undergraduate Research

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The Office of Undergraduate Research

The Honors College

University of Houston

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UNIVERSITY of HOUSTON
OFFICE OF UNDERGRADUATE RESEARCH

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2013 Early Mentoring Award
Maria Victoria Tejada-Simon

Maria Victoria Tejada-Simon

Maria Victoria Tejada-Simon, Assistant Professor in the Department of Pharmacological and Pharmaceutical Sciences, is the inaugural recipient of the Office of Undergraduate Research's Early Mentoring Award for 2013.

Dr. Tejada-Simon is on a mission. Her goal: to prepare our next generation of teachers, scientists, and health care providers to excel in the classroom, in the laboratory, and in the workforce. Although the University of Houston's College of Pharmacy primarily serves professional students, Dr. Tejada-Simon has made it a priority to provide challenging, fulfilling research experiences to undergraduates and professional students since she joined the faculty in January 2008. "She views each student that works with her as a diamond in the rough to be pressed hard, nurtured, criticized when appropriate, and empathetically encouraged when needed, all with the objective of creating a life-long learner, skilled in the art of discovery," says Dr. Douglas C. Eikenburg, Chair of the Department of Pharmacological and Pharmaceutical Sciences and Associate Professor of Pharmacology.

A solid foundation for a career in medicine is built both in the classroom and beyond. In addition to encouraging her students to work in the lab, Dr. Tejada-Simon also assists with students' placement in summer training programs and opportunities abroad. By way of example, she assisted Annie Pally in acquiring a DAAD-RISE grant to conduct summer research at the University of Frankfurt. Annie shares, "[Dr. Tejada-Simon] helped to completely fund my trip and research abroad by acquiring grants and awards from multiple sources. Steadfast and persistent, she faithfully and unconditionally supports the well-being and growth of her students."

The diverse population at the University of Houston inspires Dr. Tejada-Simon to broaden the involvement of underrepresented groups within the College of Pharmacy. "It is important to me to keep an eye on the involvement of minority and economically disadvantaged students I encourage them to come into the lab and discuss the possibility of pursuing a career in research through graduate or professional school."

Dr. Tejada-Simon extends her support and encouragement to her students throughout their academic career. Mary Elhardt, a medical student at UT Southwestern, states, "Dr. Tejada-Simon mentored me while I worked in her lab. She encouraged me to apply and present my summer research in the Alliance for Graduate Education and the Professoriate program at UH. She mentored my Senior Honors Thesis project, which won an Outstanding Senior Honors Thesis award from the Honors College." Mary then worked with Dr. Tejada-Simon as a research technician and collaborated on two journal publications. They presented their findings at numerous conferences all over the U.S. "She continues to check in on me. I am certain that our close relationship will be lifelong."

The Tejada-Simon Lab

With a palpable enthusiasm for teaching and mentoring, Maria Tejada-Simon's investment in her students' success is deeply personal. Professor Eikenburg states, "MariVi is a shining example of what any administrator would hope that all of their faculty would aspire to as a mentor of undergraduate students in research."

2013 Lifetime Mentoring Award
Rakesh Verma

Rakesh Verma

Rakesh Verma, a Professor in Computer Science, is the recipient of the Lifetime Mentoring Award for 2013.

Over the last two decades, Professor Verma has established an exceptional record of teaching, research, and service to the University of Houston. In addition to his involvement with the Computer Science's NSF-sponsored Research Experience for Undergraduates (REU) program, he has also helped to build a partnership with IITs in India with an undergraduate exchange component.

Professor Verma guides his mentees through each stage of the research process, which includes not only choosing a problem and solving it, but also effectively presenting the solutions and writing articles for publication that will withstand the rigorous peer review process. "The solution stage typically requires a lot of brainstorming and we end up spending many hours together at the board in my office or in the laboratory," says Professor Verma. "The goal is to show the mentee *how* to think about a problem and not *what* to think."

Professor Verma urges his students to create research projects with real-world impact that are global in scope. His work on Automatic Detection of Phishing Emails with student Nabil Hossain won the CougarPitch Award at the Bauer Competition in 2011. Nabil shares, "Our work required very deep discussions and intense programming in a very limited time. Professor Verma taught me to never give up hope, and he spent extra time working on our research, even on weekends. This winter I went to Bangladesh to present our research discoveries at the University of Rajshahi, where I was congratulated for our innovative work."

"Dr. Verma's mentoring techniques were effective in bringing my research skills up to speed fast," says Samuel Blackshear, a Ph.D. student in Computer Science at the University of Colorado. "Getting a paper written and published would never have been possible if Dr. Verma had not pushed me to continue refining my ideas even after the REU was over. He reviewed drafts of our paper, helped me rewrite key sections, pointed out holes in my ideas, and assisted me in choosing an appropriate conference to submit our paper to." Blackshear presented their findings at the 2010 Association for Computing Machinery (ACM) Symposium on Applied Computing in Sierre, Switzerland.

He has mentored dozens of undergraduates over his 23 year career at the University of Houston, and the majority go on to top tier Ph.D. programs or into successful careers. "Professor Verma has made such a significant investment in undergraduate research," says Jaspal Subhlok, Chair of the Department of Computer Science. "To find someone like him is refreshing and rare."

photo from Shutterstock.com

SYNTHESIZING SUBSTITUTED BORRERINES FOR HETERODIMERIZATION

SURF STUDENT: ASHAR AFAQ
FACULTY MENTOR: JEREMY MAY
DEPARTMENT: CHEMISTRY

Flindersial alkaloids, natural compounds from the *Flindersia* genus, possess strong anti-malarial properties. However, production of these compounds has proven difficult due to inefficient synthetic strategies. By using substituted borrerine precursors, heterodimerization was hypothesized to generate a variety of flindersial alkaloid derivatives. Bromine (deactivator) and hydroxyl groups (activator) were attached on separate tryptamine molecules to generate substituted borrerines that would later be dimerized to yield new flindersial alkaloid derivatives.

GIRLS REACHING AND DEMONSTRATING EXCELLENCE (GRADE)

SURF STUDENT: MONA AHMADY
FACULTY MENTORS: JOHN GLOVER, FRITZ CLAYDON
DEPARTMENT: ELECTRICAL & COMPUTER ENGINEERING

This SURF project involved working as a mentor in GRADE Camp, with a group of professors and students from the Cullen College of Engineering, and supporting Dr. Glover to develop new activities for the robotics aspect of the camp for the upcoming summer. GRADE Camp includes students from grades 8 through 12. There were different engineering labs and projects that were designed to attract young girls to the world of technology. The main part of the camp was the robotics lab, where all the girls built and programmed their own robot in groups of two or three, each group guided by a mentor. NXT Lego Robots were used in these labs. Other programs included the Scream lab, Motors and Generators lab, and the Biomedical lab. The summer study also included testing whether the new program (RobotC) is suitable for next year's camp or not. All the potential robotic projects for Grade Camp were tested using new software.

THE NEURAL REGULATION OF EXPLORATION IN *DROSOPHILA*

SURF STUDENT: HARITH AL-BALDAWI
FACULTY MENTOR: GREGG ROMAN
DEPARTMENT: BIOLOGY & BIOCHEMISTRY

Exploration is defined as behaviors that permit the gathering of information about novel environments. Interestingly, decreases in exploration represent a significant measure of depressive-like systems in mammalian model organisms. Despite this, little is known about the neural and genetic regulation of exploration in any system. It is the goal to understand how exploration is encoded and regulated within the *Drosophila* brain. It was taken advantage of the fact that starved flies show an increase in exploration. Through SURF the hypothesis was tested that the regulation of starvation-increased exploration is due to dopamine signaling to the *Drosophila* insulin-like peptide (DILP2) neurons in the *pars intercerebralis* (PI) inside the *Drosophila* brain. Flies lacking the DopR1 dopamine receptor show defects in exploration, and the expression of this receptor only in the PI neurons rescues this defect.

MOLECULAR DYNAMICS SIMULATION OF TISSUE FACTOR CYTOPLASMIC DOMAIN ("TFCD") AND PETIDYL-PROLYL ISOMERASE ("PIN-1") WW DOMAIN

SURF STUDENT: AMIR ALI
FACULTY MENTOR: JAMES BRIGGS
DEPARTMENT: BIOLOGY & BIOCHEMISTRY

Tissue Factor ("TF") plays a key role in the initiation of coagulation. TF is known to form a complex with TF/Factor-VIIa involved in signaling in angiogenesis, tumor progression and blood coagulation. TFCD contains Ser258-Pro259, a known recognition sequence for Pin-1. Pin-1 contains an N-terminal WW domain, a family of small (38-40) amino acid protein-protein interacting domains characterized by two tryptophan residues separated by 20-22 amino acids. Pin-1's WW domain has been shown to bind to the phosphorylated form of TFCD with high affinity.

Using the NAMD and VMD programs, an energy minimization was performed followed by heating and equilibration of the complex under all-atom and explicit water conditions. A twenty-nanosecond molecular dynamics simulation of the complex was then performed with and without applied NMR constrains. The pose being evaluated of the complex is one of twenty-five poses generated by a Monte Carlo simulation of the complex with applied NMR constraints. The configurations from the molecular dynamics simulation will later be compared to the Monte Carlo ensemble potentially supporting the predicted structure of the complex.

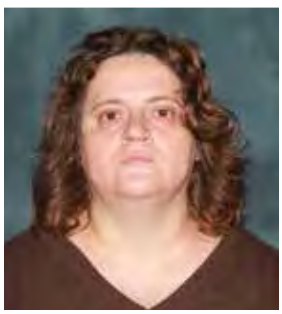
CONTROLLED DRUG RELEASE USING BIODEGRADABLE POLYMERIC NANOPARTICLES

SURF STUDENT: ASHISH BHATTARAI
FACULTY MENTOR: MEGAN ROBERTSON
DEPARTMENT: CHEMICAL & BIOMOLECULAR ENGINEERING

Micelles are nanostructures formed by spontaneous arrangement of amphiphilic block copolymers in solvent. The driving force for this self-assembly is to minimize the energetically unfavorable interactions between the hydrophobic micelle core and solvent (typically water). Micelles find numerous applications, with the most common examples being detergents, enzymes, emulsions, catalysis and more recently as drug delivery vehicles. The model system chosen for this project is a diblock copolymer of poly(ethylene oxide-*b*-ε-caprolactone) (PEO-PCL), and the selected solvent is a mixture of water and tetrahydrofuran (THF). THF is added as a co-solvent to modify the interactions between the micelle core and the solvent. Poly(ethylene oxide) (PEO) is hydrophilic and forms the outer shell, while polycaprolactone (PCL) is hydrophobic and forms the core. PEO-PCL is an attractive choice for targeted drug delivery as both of the polymers are biocompatible and partially biodegradable.

This research focused on the mechanisms which govern the release of encapsulated molecules within the micelle cores as an estimation of the residence time of a drug. Fluorescent dyes are used to model the behavior of drug molecules. The objective was to identify the factors that influence the rate of release of the drug molecules from the micelles.

THE STUDY OF MUTATIONS IN CARDIAC TROPONIN C



SURF STUDENT: MARYAM BURNEY
FACULTY MENTOR: SVETLANA TIKUNOVA
DEPARTMENT: PHARMACOLOGICAL & PHARMACEUTICAL SCIENCES

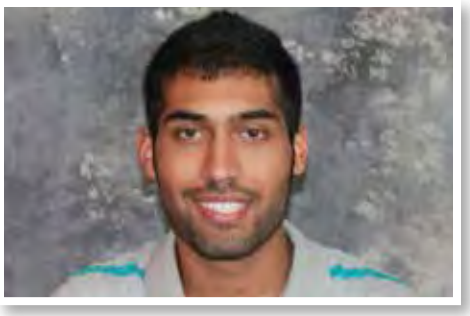
In a healthy human heart, calcium dependent interactions between cardiac troponin C (cTnC) and other muscle proteins lead to muscle contraction. It has been known that certain mutations cause such interactions to function improperly, causing deterioration of cardiac function; a condition known as cardiomyopathy. The objective of this experiment was to determine the effect of specific mutations in the central alpha helix of cTnC on calcium binding properties of cTnC. Therefore, two different sets of mutations, D87A/D88A and E94A/E95A/ E96A, were created in the central alpha helix region of cTnC. An elaborate process that included protein mutagenesis, expression, purification, and fluorescent spectrometry helped to accomplish the objective of this work. The result of the experiment was that the D87A/D88A mutation resulted in lower calcium sensitivity, and therefore the acidic residues D87 and/or the D88 sensitize cTnC to calcium. The E94A/E95A/E96A mutations, however, had no significant impact on calcium sensitivity. In the future, the possibility of creating and using gene therapy to target faulty genes can help treat patients with heart disease.

THE INVESTIGATION OF THE EFFICIENCY OF A NEW NUMERICAL METHOD TO CALCULATE THE ELECTRIC POTENTIAL OF A DYNAMIC HALF-LINE SOURCE AT LOW FREQUENCIES

SURF STUDENT: MATTHEW CASELLA
FACULTY MENTOR: DAVID JACKSON
DEPARTMENT: ELECTRICAL & COMPUTER ENGINEERING

A new numerical method is used to calculate the electric potential of a dynamic half-line source in three-dimensional homogeneous space. Using MATLAB, a mathematical computer programming software, five methods were programmed and tested to calculate the potential and to verify the findings from previous research. Then, a new numerical method was programmed and used to calculate the potential. This new method was then compared against the original four methods in terms of accuracy and computational cost in order to find an area in homogeneous space where it is most efficient. The new method is advantageous at low frequencies, where the distances from the axis of the half-line source are small relative to a wavelength. This new method is expected to be especially useful in applied electromagnetics to help accelerate complex calculations involving layered media. As such, this method will become one component in the larger frequency domain modeling code called EIGER, which has a wide range of applicability in electromagnetics and was partly developed by researchers at the University of Houston in collaboration with Sandia National Laboratories, Lawrence Livermore National Laboratory, NASA, and SPAWAR.

A DATA-DRIVEN EMPIRICAL MODEL OF CHOICES – ILLUSTRATED BY UNDERGRADUATE COURSE SELECTION AND GPA



SURF STUDENT: KISHANT CHATARPAL
FACULTY MENTOR: NORMAN JOHNSON
DEPARTMENT: DECISION & INFORMATION SCIENCE

The vast majority of research to date examines how people make choices by looking at one choice at a time in settings that are contrived. As a result, little is known about how people make multiple choices in situations where a variety of factors are at play together. This project is an initial attempt to address this shortcoming. Today's technologies allow the capture of large amounts of data on actual choices that people make. An empirical model of choices and consequences was developed by using what are called data mining techniques on such data. The focus was on students' choices of courses at UH and their GPAs. It was found that, among other things, students **do not** appear to choose courses in ways that help to increase their GPAs. Students, however, make better progress on their GPAs when they are at the sophomore and senior academic levels. As a result of their choices, Caucasian students have similar and higher GPAs than Hispanic, Asian and Black students. In general, female students tend to choose courses that help them have higher GPAs. These findings can be used as a basis for defining policies to help students make choices that yield better results for them.

DYNAMICAL PROPERTIES OF THE CONTEXT-FREE SHIFT

SURF STUDENT: SCOTT CONRAD
FACULTY MENTOR: VAUGHN CLIMENHAGA
DEPARTMENT: MATHEMATICS

In symbolic dynamics, the context-free shift consists of biin finite sequences of concatenated strings of the form 01^k2^k where k is a nonnegative integer. This shift has been thoroughly studied in formal language theory and theoretical computer science, but its dynamical properties have not likely been investigated. To that end, the context-free shift serves as an interesting counterexample in thermodynamic formalism: using a result of Climenhaga and Thompson, it was proved that the shift has a unique measure of maximal entropy, that the language of the shift is not edit approachable by any subset with the specification property and that the shift has a Holder continuous potential with a zero entropy equilibrium state, which is believed to be the first such example to be explicitly constructed.

STEREOSELECTIVE FORMATION OF A CHIRAL MOIETY OF APRATOXIN D

SURF STUDENT: KYLE ELMORE
FACULTY MENTOR: DON COLTART
DEPARTMENT: CHEMISTRY

This project explored a new method for the development of the polyketide moiety of Apratoxin D using significantly milder conditions than a previously developed synthetic route. Through the use of a chiral non-racemic N-acyl-oxazolidinone (Evans Auxiliary), stereochemical control was achieved on the ß-carbon stereogenic center. Derivitization of the moiety was demonstrated through the practice of the synthetic route on both the trans-2-butenoic acid substrate as well as a trans-2-pentenoic acid substrate, thus producing the moiety with the methyl group at the chiral center, as seen in the natural Apratoxin D compound, as well as producing an alternate form with an ethyl group at the chiral center.

A Study of Nietzsche's Concept of Drive

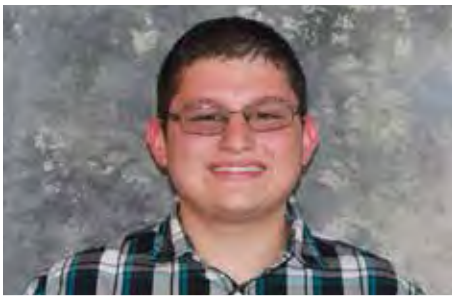
SURF Student: Gerardo Espinal Franco
Faculty Mentor: Iain Morrisson
Department: Philosophy

Nietzsche relies on assumptions about drives to launch historical and psychological investigations into development of morality. In the *Genealogy of Morals*, drives are at the center of the single event which allows for the discussion of the text's central themes. These themes include: "bad conscience", "guilt", "the acetic ideal", the noble morality of "good and bad" and the slave morality of "good and evil." The single event, to which the study referred, is the "internalization of man." The moment in which the nomadic "half-animals" (prehistoric men) were forced "to succumb under the pressure of that most fundamental of all changes"—societal living—their drives or instincts turned inwards. (GMII 16) Understanding the changes incurred by drives at these crucial points serves to better understand Nietzsche's account of the development of morality. This SURF project aimed at bringing out Nietzsche's assumptions about drives to gain such an understanding.

Attentional Biases in Novel Adjective Learning

SURF Student: J. Alex Fisher
Faculty Mentor: Hanako Yoshida
Department: Psychology

When a child hears a new word, there are infinite possibilities for what that word may refer to. For example, the word could be a noun referring to an object, a verb referring to an action, or an adjective describing an object (Quine, 1960). With hundreds of potential referents in the child's view, how does a child decipher precisely what a new word is meant to refer to? Fortunately, children are capable of picking up on statistical regularities within their language, which results in learned biases that facilitate further language learning (Saffran, Aslin & Newport, 1996; Landau, Smith, & Jones 1988). If we are able to understand the mechanism behind adjective learning, perhaps we can help children's early language acquisition. The proposed study would investigate the role of children's visual attention biases on the learning of novel adjectives for three types of visual features: shape (e.g. round), color (e.g. blue), and texture (e.g. shiny).



HEAT INDUCED EPITOPE RETRIEVAL FOR CEREBRAL VASCULATURE

SURF STUDENT: STEVEN GREGORY
FACULTY MENTOR: JASON ERIKSEN
DEPARTMENT: PHARMACOLOGICAL & PHARMACEUTICAL SCIENCES

The cerebral vasculature plays a critical role in a variety of diseases such as Alzheimer's disease. It has been difficult to study due to a lack of methods that are suitable for three dimensional analyses. Current methods are inefficient and/or complicated to perform. By adjusting the Heat Induced Epitope Retrieval (HIER) in immunofluorescence, vasculature staining is possible. HIER is performed to unfix tissue samples and to open up epitopes or binding sights for antibodies to bind too. These antibodies are then fluorescently tagged so that the target proteins are visible. Typically, sodium citrate is used in HIER, but this fails to retrieve epitopes for vasculature staining. This SURF project revealed a series of compounds that allows the detection of vascular proteins. When these compounds are used in conjunction with collagen IV antibodies the basement membrane of blood vessels are fluorescently labeled, revealing the entire cerebral vasculature.

EFFECTIVENESS OF ELECTRONIC MEDICAL RECORDS (EMR) IN AMERICAN HEALTH CARE

SURF STUDENT: VISHAL GULATI
FACULTY MENTOR: XIN DING
DEPARTMENT: INFORMATION & LOGISTICS TECHNOLOGY

Electronic Medical Records (EMRs) offer significant potential to reach the triple aims of better health, better care and lower cost. Hospitals have been adopting EMRs in response to the Affordable Care Act of 2010, popularly known as "Obamacare," with the goal to improve the overall quality and efficiency of healthcare. Although considered an effective tool to enhance health care performance and address the threat of rising national health care costs, this research seeks to numerically prove the effectiveness of EMRs. By using a database provided by Healthcare Information and Management Systems Society (HIMSS), which shows the extent to which hospitals have adopted EMR systems, multivariate linear regression analyses were performed comparing performance metrics of various American acute-care hospitals. Specifically, this research analyzes the impact of hospital-wide EMRs on performance measures including net operating revenue, total operating expense, number of adjusted patient days, number of outpatient visits, number of total discharges, and number of total patient days by controlling a number of factors including teaching status, age, size, and department-level information systems. Overall, the research results suggest that hospital-wide EMRs greatly improve hospital performance.

THE ECONOMICS OF CONQUEST

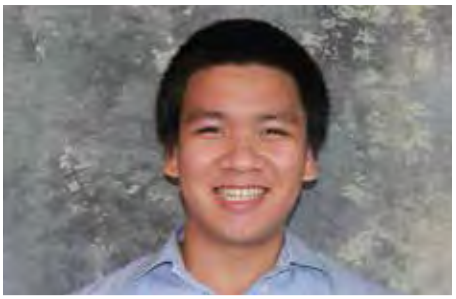
SURF STUDENT: WM. KEVIN HARTLEY
FACULTY MENTOR: FRANK HOLT
DEPARTMENT: HISTORY

Alexander the Great remains one of the most important historical figures of all times. He was twenty-two years old in 334 B.C. when he marched his army into Asia and conquered the vast Persian Empire, plundering treasures almost too vast to comprehend. He died 11 years later in Babylon with no chosen heir to his throne and his vast land holdings and trove of treasures were divided among his generals. In order to understand the depth and breadth of the economic ramifications of this transition, all instances of quantification in the five most reliable historical sources available were extracted from the texts and recorded in a spreadsheet. Dr. Holt analyzed the data in order to determine if and which of the numbers were patterned by literary license for dramatic effect. He concluded that such cases were present throughout all five sources, and adjusted his economic evaluations accordingly.

SHALLOW SUBSURFACE DETECTION OF BURIED, WEATHERED HYDROCARBONS

SURF STUDENT: KIRSTIE HAYNIE
FACULTY MENTOR: SHUHAB KHAN
DEPARTMENT: EARTH & ATMOSPHERIC SCIENCES

Elmer's Island, Louisiana, a site known for having large amounts of oil washed ashore from the 2010 Deepwater Horizon oil spill, was selected for a geophysical survey to detect the presence of buried, weathered hydrocarbons. Ground penetrating radar (GPR) surveys, using 200 MHz and 400 MHz antennae, were conducted at the site along several traverses. The 400 MHz data show two distinct anomalous zones with strong positive amplitudes. An electromagnetic (EM) profiler, operated along the same lines, displays rows of oval shaped anomalies in conductivity contour maps. The two anomalous zones observed in the GPR data correspond with anomalies displayed on these maps. Field observations confirmed the existence of contaminated sand buried at the survey site in distinct layers. This contaminated sand enclosed small aggregates of weathered hydrocarbons, which may be associated to the oval shape of anomalies. By correlating this data with aerial imagery, maps can be created which will aid clean up efforts for future oil spills.



AB-INITIO ANALYSIS OF ARSENIC TRIMERS

SURF STUDENT: VINH HO
FACULTY MENTOR: VASSILIY LUBCHENKO
DEPARTMENT: CHEMISTRY

Amorphous chalcogenides have many unique properties useful in optical drive, Blu-Ray, and phase-change memory technology. They also exhibit a number of anomalies in their electronic structure that have puzzled researchers for decades. These anomalies are epitomized by special electronic states found in the forbidden gap, known as midgap states. It is hypothesized that relatively local, hypervalent structures in glassy chalcogenides give rise to the midgap states and are central to the phase-change properties of these materials. The electronic structure of chalcogenides, both amorphous and crystalline, has posed fundamental challenges and has yet to be fully determined. The study involved approaching the problem by using linear arsenic trimers as the simplest model system for chalcogenides, to explain the relationships between covalent, closed-shell, and multicenter bonding. *Ab-initio* calculations with GAUSSIAN and Firefly, using a triple zeta quality basis set, revealed a symmetry breaking, where arsenic transitions from a stable trimer to a stable dimer-monomer as the length of the chain increases, with bonding being primarily of ppσ-type. This symmetry breaking is largely driven by the steric repulsion between the ionic cores and the lowest lying valence molecular orbital. The present, rich interplay of the electronic structure and steric repulsion in arsenic trimers is consistent with experiment.

CONTINUOUS HEMATOCRIT MONITORING USING OPTICAL COHERENCE TOMOGRAPHY

SURF STUDENT: THOMAS HSU
FACULTY MENTOR: KIRILL LARIN
DEPARTMENT: BIOMEDICAL ENGINEERING

The goal of this study is to develop an optical noninvasive method to continuously monitor the hematocrit based on optical coherence tomography (OCT). A phase-sensitive spectral domain OCT system was utilized. A continuous flowing system including a vein-like chamber, plastic tubes and switches, and a programmable syringe pump is designed and built for *in vitro* blood experiments. Two hematocrit levels of 30% and 40% were created from centrifuging the fresh rabbit blood samples. The refractive index of the continuous flowing blood samples can be revealed from the OCT phase difference detected from the top and the bottom surfaces of the inner chamber. The results indicate that the optical phase information from OCT is sensitive to the hematocrit change of the *in vitro* flowing blood. Further study will be focused on the quantification of the refractive index variation and the assessment of the accuracy and sensitivity of this approach.

The Effect of Social Support on Physical Activity Adoption in Middle Adolescence

SURF Student: Ashley Jones
Faculty Mentor: Rebecca Lee
Department: Health & Human Performance

Half of adolescents in the U.S. participate in moderate to vigorous physical activity, or MVPA, fewer than 3 days a week, far below recommended guidelines. Social support from parents and peers for physical activity has been associated with high levels of physical activity in early adolescence. Moreover, physical activity habits learned in adolescence track into adulthood. Thus, it is important to examine strategies for improving physical activity adoption, via social support, in middle adolescence. The Sustainability via Active Garden Education (SAGE) project exposed high school students to specific training in healthy lifestyles to prevent obesity, in real world settings. Five high school students attended scientific lessons and garden maintenance for five weeks. Students completed a pre (Time 1) and post (Time 2) health survey packet which included reliable and valid physical activity and social support questionnaires. It was hypothesized that higher social support at Time 1 would be associated with increased physical activity after the five week study (Time 2). Time 1 friend social support was significantly associated with Time 2 physical activity; family and total social support were not associated with physical activity. After adjusting for baseline physical activity at Time 1, multiple regression demonstrated a marginally significant relationship between less social support at Time 1 and greater physical activity adoption at Time 2. Contrary to the hypothesis, less friend social support was associated with an increase in physical activity. This result could be due to possible gains in social support given during the fellowship program or may reflect the small sample size.

The Coordinated Upregulation of Retinal Cell Cycle Progression and Exit Increased Late-Born Neurogenesis During Gestational Lead Exposure (GLE)

SURF Student: Mohamed Kaplan
Faculty Mentor: Donald Fox
Department: Optometry

GLE increases retinal progenitor cell (RPC) proliferation and differentiation of late-born rods and bipolar cells, but not Müller glial cells. Our goals were to assess age-dependent RPC cell cycle progression and cell cycle exit, and the production of late-born neuronal precursors. Female C57BL/6N mice were exposed to tap water or lead solution throughout gestation and until postnatal day 10 (PND10). PND1-7 pups were injected with BrdU and euthanized 24 hours later. PND2-10 pups were used for RT-qPCR, Westerns and confocal immunohistochemistry. Confocal studies showed an age-dependent spatial patterns of BrdU (S-phase marker), MCM6 (RPC marker) and OTX2 (rod/bipolar cell precursor marker) were similar in control and GLE retinas. However, in GLE retinas, the number of BrdU-immunoreactive (IR), MCM6-IR and OTX2-IR cells was increased at each age. RT-qPCR and Western blots were consistent with these results. Confocal experiments also revealed that the proportion of RPCs in and exited cell cycle was higher in GLE retinas. Moreover, the proportion of RPCs that exited as late-born neuronal precursors was higher in GLE retinas. GLE produced novel proliferative effects on RPCs and neurons. This experimental model will help decipher the complex and intricate molecular mechanisms underlying RPC cell cycle and cell fate. These findings have relevance for neurotoxicology, ophthalmology, pediatrics and public health. Supported by NIH Grants ES012482 and EY07551, and UH SURF.

SMARTPHONE USER AUTHENTICATION

SURF STUDENT: CHRISTOPHER KRIVIK
FACULTY MENTOR: WEIDONG SHI
DEPARTMENT: COMPUTER SCIENCE

As the general population comes to rely more and more on smartphones for managing our professional and social lives, the issue of protecting personal information stored on smartphones becomes critically important. Many people store their bank information, social security number, email address passwords on their smartphone trusting that they have sole access. However, in the event of loss or theft, there are very thin security measures to keep out intruders. In this project funded by the Department of Homeland Security, user authentication software is developed in order to better ensure that personal data remains secure. The software will leverage information collected by the voice, touch, GPS and accelerometer sensors of the phone on a regular basis and use this data to decide when the person using the phone is not the rightful owner and whether to send alerts or take other defensive actions.

MAST CELLS, C-KIT AND CORNEAL WOUND HEALING IN THE MOUSE

SURF STUDENT: PAUL LANDRY
FACULTY MENTOR: ALAN BURNS
DEPARTMENT: OPTOMETRY

The cornea is essential in maintaining normal vision, accounting for nearly 75 percent of the refractive power of the eye. The corneal epithelium has one of the highest innervation densities in the body, well over 300 times greater than that of skin (Rózsa et al.,1982). Importantly, these nerves provide trophic factors that maintain the integrity and health of the corneal epithelium (Lu et al., 2001). Following a corneal abrasion injury, where both the epithelium and its nerve supply are damaged, the ensuing acute inflammatory response plays a critical and beneficial role in nerve regeneration. Currently, it is unclear how nerve regeneration is sustained over these extended periods of time but preliminary data in the cornea suggest mast cells play an important role in regulating the inflammatory response (Burns et al., 2012). Moreover, mast cells are also capable of releasing a variety of growth factors that may benefit sustained tissue regeneration after injury (Beghdadi et al., 2011; Benowitz et al., 2011). Corneal epithelial wound healing is diminished in mutant mice lacking c-kit, a receptor for stem cell factor normally expressed on corneal epithelial cells (Mishra et al., 2011; Miyamoto et al., 2012). Establishing a mouse model to identify the mast cell as an important regulator of corneal nerve regeneration will guide future therapeutic efforts towards identifying mast cell mediators that might prove useful in the clinic to treat corneal injuries involving epithelial nerve loss (e.g., contact lens wear, LASIK and PRK surgeries).

CORRELATION BETWEEN ANTIBIOTIC DEGRADATION AND OP PESTICIDE DEGRADATION IN BACTERIAL ORGANISMS

SURF STUDENT: LISA LAU
FACULTY MENTOR: RUPA IYER
DEPARTMENT: BIOTECHNOLOGY

β-lactam antibiotics are frequently used to treat bacterial infections of which include: penams, cephems, carbapenems, and monobactams. This class of antibiotics shares a common β-lactam ring structure that can be degraded by bacteria with the enzyme β-lactamase. Strains that can degrade antibiotics might have the capability of degrading organophosphorus (OP) pesticides by using a metallo-β-lactamase. These OP pesticides that most farms are using to keep pests away can affect the human nervous system at low levels of exposure. Long time exposure to these pesticides can lead to developmental effects, cancer, and Parkinson's Disease. Previous methods of removing these pesticides include: deep ocean dumping, chemical treatment, and open-bit burning. Although the processes mentioned are able to remove pesticides, it often releases unsafe by-products into the environment. By determining if bacteria contain a metallo-β-lactamase, they can be used to degrade these harmful pesticides in a more efficient and cost effective manner.

MODERATE TREADMILL EXERCISE RESCUES ANXIETY AND DEPRESSION-LIKE BEHAVIOR AND MEMORY IMPAIRMENT IN A POSTTRAUMATIC STRESS MODEL

SURF STUDENT: LUMENG LI
FACULTY MENTOR: KARIM ALKADHI
DEPARTMENT: PHARMACOLOGICAL & PHARMACEUTICAL SCIENCES

Post-traumatic stress disorder (PTSD) is an anxiety disorder that can develop as a result of exposure to a severe traumatic event such as those occurring during wars or natural disasters. In this project we will use the single-prolonged stress (SPS), a rat model of PTSD, to study the effect of regular exercise as a potential therapeutic approach for PTSD-induced deficits including anxiety-like behavior, depression, and memory function impairment. Extensive evidence shows that regular exercise is beneficial in ameliorating memory impairment, enhancing cognitive function and preventing memory decline. Forty Wistar rats were randomly assigned to one of four groups: control, exercise, PTSD, or PTSD exercise. After the SPS model, rats were exercised on treadmill for 2 weeks. Rats in all groups were tested for anxiety-depression-like behaviors and memory function. Rats were sacrificed, blood was collected, and individual organs were harvested for weight comparison. Results suggest that physical exercise ameliorates PTSD-induced symptoms.

INCREASED FREQUENCY OF NONSUICIDAL SELF-INJURY IN COMORBID DEPRESSION AND ADHD AND THE ROLE OF EXECUTIVE FUNCTIONING

SURF STUDENT: TESSA LONG
FACULTY MENTOR: CARLA SHARP
DEPARTMENT: PSYCHOLOGY

Nonsuicidal self-injury (NSSI) is defined as "the deliberate destruction of body tissue without conscious suicidal intent but resulting in injury severe enough for tissue damage to occur" (Gratz & Roemer, 2008). NSSI has been found to be common among both community and inpatient adolescents and has implications for higher suicidality (Braush & Gutierrez, 2010; Hawton, Saunders, & O'Connor, 2012; Andover, Morris, Wren, & Bruzzese) representing a public health concern. Previous studies looking at rates of NSSI in major depressive disorder (MDD) and attention deficit/hyperactivity disorder (ADHD) separately have shown high rates among both groups. However, no studies have explored the relation between comorbid MDD and ADHD (MDD+) and NSSI. The present study aimed to measure rates of NSSI in groups of adolescent inpatients with MDD alone, MDD+, and ADHD alone. Our second aim was to explore whether executive function accounted for the differences in NSSI between groups. We found that the group with MDD had the highest rates of NSSI, however there were no significant differences between MDD and comorbid MDD+. We explored methodological difficulties in our measure of NSSI. Future research is needed to further explore NSSI in comorbid disorders.

INVESTIGATING RIBOSOMAL PROTEIN L27 BY MUTAGENESIS IN ORDER TO IDENTIFY MECHANISM DURING PROTEIN SYNTHESIS

SURF STUDENT: JOHN LOYOLA
FACULTY MENTOR: YUHONG WANG
DEPARTMENT: BIOLOGY & BIOCHEMISTRY

Antimicrobial agents are the main therapeutic tool to control and treat a variety of bacterial infectious diseases. However, over use of antimicrobials in humans has resulted in the emergence of strains of bacteria that no longer respond to antimicrobial therapy. Antimicrobial-resistant pathogens pose a threat to the public health. Addressing the issue of antimicrobial resistance is one the most urgent priorities in the fields of public health. One mode of bacteria proliferation is through protein synthesis. The ribosome is a universal machine that synthesizes proteins. In the following experiment, the role of a stabilizing protein L27 in the ribosome is investigated. Select amino acids are mutated followed by an attempt to sub clone the mutation into viable plasmid for transformation. The implications will provide information about the mechanism of protein synthesizes.

TRENDS IN HOUSTON AIR POLLUTION

SURF STUDENT: ERIKA MARRERO
FACULTY MENTOR: BARRY LEFER
DEPARTMENT: EARTH & ATMOSPHERIC SCIENCES

The research aims to study the changes in the major sources of nitrogen oxides (NOx) and volatile organic compounds (VOCs) that pollute the city air in order to understand the recent reductions in ground level ozone resulting in significant improvements to Houston's air quality. Advanced technological equipment as well as routine air quality monitors has been used in several studies over the past 15 years to better understand Houston's air quality problems. This rich dataset is a wonderful resource that can be used to analyze trends in ambient levels of ozone and its precursors (NOx and VOCs). The objective of the project is to analyze and evaluate the long term trends in NOx, VOCs, CO, O_3, and various meteorological parameters over the past 10-15 years of monitoring data in order to understand the reasons why ozone levels are significantly decreasing in the Houston region.

EFFECT OF NICOTINE EXPOSURE ON FETAL DEVELOPMENT

SURF STUDENT: SRUTHI MATHEWS
FACULTY MENTOR: KIRILL LARIN
DEPARTMENT: BIOMEDICAL ENGINEERING

Maternal nicotine exposure during pregnancy can impair fetal development. This study investigates the morphological changes in the brain due to nicotine exposure during fetal development, using optical coherence tomography (OCT). Mice were exposed to nicotine during pregnancy and on gestational day 14.5, fetuses from these and non-nicotine exposed mice were obtained and imaged using a swept-source optical coherence tomography (SSOCT) system. Images of the head were obtained and parameters such as distance between eyes, distance between eyes and back of the head, head circumference and head area were measured. Statistical comparison was done comparing fetuses that experienced maternal nicotine exposure and control fetuses. At a 95% confidence level, the area of the head was the only metric to result in a statistically significant result with a p-value of .03. The results of the comparison of this metric indicate that the difference in embryonic development may be nicotine-induced.

SOURCES AND EMISSIONS OF THE GREENHOUSE GAS METHANE TO THE ATMOSPHERE OVER TEXAS

SURF STUDENT: LUZ MENDOZA
FACULTY MENTOR: ROBERT TALBOT
DEPARTMENT: EARTH & ATMOSPHERIC SCIENCES

Methane is a greenhouse gas of great importance because it is twenty times more effective than carbon dioxide in absorbing and reflecting radiation back to the Earth's surface. A buildup of methane in the atmosphere may have serious consequences for the environment. This research focuses on determining the largest sources of methane in the Houston metropolitan area as well as the specific sources of methane. For this purpose data was collected from atop Moody Tower continuously. The instrument used to do so was built by Picarro, and it measures the carbon isotope $\delta^{13}C$ and its concentration in the atmosphere. After plotting the data collected over a one year period, it was concluded that the highest concentrations of methane were coming from areas east and northeast of Moody Tower. Now the sources of these concentrations need to be determined using the $\delta^{13}C$ isotopic signatures.

TERM LIMITS AND THE ELECTION OF WOMEN TO STATE LEGISLATURES

SURF STUDENT: CYNTHIA MILIAN
FACULTY MENTOR: JENNIFER CLARK
DEPARTMENT: POLITICAL SCIENCE

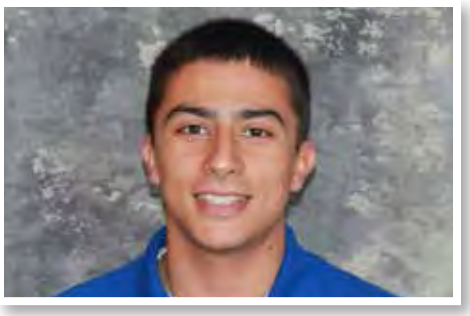
Women are underrepresented in US political institutions, and many attribute this underrepresentation to the incumbency advantage. Proponents of term limits argue that restricting reelection benefits women. However, recent studies fail to find a strong linkage between term limits and women's representation in state legislatures. Previous studies fail to account for different types of term limits (i.e., consecutive versus lifetime bans) and are often limited to case studies over a narrow time frame. To rectify this, we reexamine the influence of term limits on women's representation in state legislatures during 1990-2012 using linear regression. In contrast to previous studies, we find that term limits enhance women's representation but only in states implementing consecutive bans on service. Lifetime bans hurt women's representation because women legislators are "termed out" but often are not replaced with other women. This suggests a critical role for the parties in recruiting viable women candidates for political office.

ACTIVE AROMATIC ERß AGONISTS

SURF STUDENT: AHMED MINHAS
FACULTY MENTOR: SCOTT GILBERTSON
DEPARTMENT: CHEMISTRY

Recent research has elucidated the role that estrogen receptor β (ERβ) plays in regulating biochemical synthetic pathways. As a result, this receptor is believed to have great potential as a therapeutic target for treating and curing human pathologies. For example, ERβ is the major subtype found in normal breasts of Homo sapiens. On the other hand, ERα predominates in patients diagnosed with breast cancer. Synthesizing molecules that are able to activate or even enhance ERβ activity may lead to future cures to debilitating diseases such as rheumatoid arthritis, cardiovascular disorders, and cancer. In order to synthesize molecules that have high binding affinities for ERβ, the Suzuki Coupling and Click reactions were utilized to create aromatic ERβ agonists. The molecules were purified using known techniques such as column chromatography and characterized via NMR. The results suggest that the aromatic compounds exhibit significant biological activity with ERβ.

MOMENT-ROTATION BEHAVIOR OF COLUMN BASE CONNECTIONS IN STEEL BUILDINGS



SURF STUDENT: JOSUE NAVARRO
FACULTY MENTOR: BORA GENCTURK
DEPARTMENT: CIVIL & ENVIRONMENTAL ENGINEERING

Column base-plates in metal structures are used to transfer gravity, wind, and seismic loads from the structure to the foundation. These connections are designed as “pinned” connections that result in an underestimation of the moment resistance, and a highly conservative design that is not cost effective. The research is in finding what the real moment resistance of this pin connection is and to compare it with other types of semi-rigid connections. To accomplish this there will be nine base-plates that will be tested. Eight of these plates will be bolted to a steel foundation beam and one of them will be bolted to a concrete foundation. These tests will investigate the effect of base-plate thickness and section size of the columns. The expected result from these tests is to develop a better understanding of the behavior of base-plate pin connections caused by the interaction of moment, and compression force.

CALIBRATION OF TEMPERATURE MEASUREMENT USING RHODAMINE B

SURF STUDENT: TAM NGUYEN
FACULTY MENTOR: PETER VEKILOV
DEPARTMENT: CHEMICAL & BIOMOLECULAR ENGINEERING

A microfluidic approach is used to study the mechanism of sickle cell hemoglobin polymerization. A thin-film heater, a temperature sensor, and a microfluidic channel form the chip. The heater is controlled using a PID controller in response to the temperature sensor. For the PID controller to work properly, it first needs to be calibrated. Rhodamine B, a fluorescent dye with temperature-dependent intensity, is used to measure the temperature in the channel. As the channel is being made, the fluorescence intensity curve is measured by placing the Rhodamine B on a glass slide with a cover slip on top. Because photobleaching becomes a problem under long exposure of light, the whole temperature range from 5 Cº to 40 Cº is split into smaller parts, which are then connected using normalization. This approach allows for measurement of the fluorescent intensity curve without significant photobleaching from 22 Cº to 40 Cº. However, from 22 Cº to 5 Cº, significant photobleaching still persists.

NICE GUYS FINISH LAST: CWB AND PERFORMANCE GOALS

SURF STUDENT: ALEC NORDAN
FACULTY MENTOR: LISA PENNEY
DEPARTMENT: PSYCHOLOGY

The impact of counterproductive behaviors (e.g., interpersonal hostility) at work has been found to cost companies billions of dollars every year, yet the research literature only examines a narrow range of motivations for employees to behave in such a way. The purpose of this study was to examine what conditions may cause employees to use these sorts of negative behaviors as a means of achieving a goal. Utilizing a sample of 79 students, it was found that when an individual possesses a challenging performance goal or a partner who interferes with goal-achievement they are more likely to engage in interpersonal hostility towards their task partner.

PERSONAL & PROFESSIONAL DEVELOPMENT IN THE GROSS ANATOMY LAB

2013 Medicine & Society Scholar

SURF STUDENT: ISAAC NORRIS
FACULTY MENTOR: HELEN VALIER
DEPARTMENT: MEDICINE & SOCIETY

The study involved an investigation on the effects that the cadaver dissection lab experience has on the personal and professional development of students. The SURF project included participating and observing a dissection course, and conducting interviews with other students in the course. The research pool included undergraduate students in a Medicine & Society course from the University of Houston and doctoral students from other schools in the Med Into Grad 2013 summer internship. Students reported strong initial reactions to the cadaver lab; these included some form of negative emotional reaction to the cadaver. Students reported that their initial reactions faded as they employed various coping strategies. The undergraduate students expressed an appreciation for the emotional support they received from their discussions. When asked about their future careers in medicine and related research fields, both groups expressed appreciation for the experience itself in addition to the anatomy knowledge they acquired.

FARMER'S MARKETS: ARE THEY A SAFE ENVIRONMENT?

SURF STUDENT: HILLARY NORWOOD
FACULTY MENTOR: JAY NEAL
DEPARTMENT: HOTEL & RESTAURANT MANAGEMENT

An increasing number of consumers support the local food movement and farmers' markets. According to the Food Safety Modernization Act (FSMA) small farmers who make less than $500,000 annually are exempt from FDA regulations. However, it is crucial that the farmers follow appropriate GAPs/GMPs/GHPs to ensure that the produce is safe for consumption. The first objective of this proposed project was to conduct an observational study in the farms, during transportation and at farmers markets. The investigators made note of effective behaviors that farmers employ to reduce foodborne disease hazards as well as possible high-risk issues. After observing several Farmer's Markets in the area, they utilized those results in the final objective, which was to develop scripts for YouTube videos and create a Best Practices animated video to communicate the behaviors to small farmers to enhance the safety of food at Farmer's Markets.

GENOTYPING GENETICALLY ALTERED MICE THROUGH PCR

SURF STUDENT: SALIL OJHA
FACULTY MENTOR: SANGHYUK CHUNG
DEPARTMENT: BIOLOGY & BIOCHEMISTRY

Cervical cancer is the 3rd most common and 4th most deadly cancer among women worldwide. It is connected to human papillomavirus that codes for E6 & E7 oncogenes. The tumorigenic potential of E6 & E7 lies in their ability to inactivate p53 & pRb tumor suppressor proteins, respectively. Despite potent oncogenic activities of these genes, evidence suggests that HPV is not enough. Estrogen has been identified as a cofactor in transgenic mouse models by acting through estrogen receptor α, which mediates mitogenic functions in cells.

Dr. Chung's lab is interested in how ERα promotes cervical cancer in cooperation with HPV oncogenes. The lab makes use of various genetically modified mice to achieve this goal, combining multiple genetic modifications by interbreeding these mice. It is crucial to identify pups that have the desired genetic modification. The mice can then be identified using polymerase chain reaction (PCR). During SURF, PCR was mastered and six alleles were successfully analyzed.

ANALYSIS OF OVERHEAD TRANSMISSION AND DISTRIBUTION LINE RELIABILITY DURING SEVERE WEATHER CONDITIONS

SURF STUDENT: PRANAY PASULA
FACULTY MENTOR: AMIN KHODAEI
DEPARTMENT: ELECTRICAL & COMPUTER ENGINEERING

Hurricanes and other severe weather conditions cause tremendous amounts of damage to coastal cities every year. Their destructive effects on power grid components are of specific concern because of the importance for power grid reliability during adverse weather. Considering the potential damage many of these storms can inflict, especially upon relatively fragile components, current methods to determine failure rates are typically not robust enough to warrant their usage. A vast amount of models exist to estimate power grid component failure and power outage probabilities, but few take into account the coupled relationship between these two factors and power network topology. This research examines factors contributing to the fragility of overhead transmission and distribution lines in various topological scenarios. An improved model for overhead line failure is created by considering the intrinsic correlation between overhead line fragility and the relative humidity of the air. The model is then further enriched by acknowledging that the amount of redundancy in overhead lines directly impacts their fragility rates. By using cluster analysis to analyze the physical consequences of redundancy, a basis for linking individual overheard line fragility and topological network fragility is established.

MEASURING WATER CLARITY IN A LASER MAPPING CONTEXT: A COMPARISON OF A SECCHI DISK, TURBIDIMETER, AND PROTOTYPE TRANSMISSOMETER

SURF STUDENT: SETH PEDERSEN

FACULTY MENTOR: CRAIG GLENNIE

DEPARTMENT: CIVIL & ENVIRONMENTAL ENGINEERING

In airborne laser bathymetry (ALB), an underwater surface can be rapidly modeled using dense laser scans. The elapsed time between the laser transmissions and returns is used to calculate the distance the laser traveled, which can be used to find the underwater terrain elevations. Water clarity is the primary factor limiting the effective mapping depth. In order to better measure this clarity (specifically the attenuation properties of the water) a low-cost transmissometer was built that measures the diminishing power of a green laser (the same wavelength used in ALB) as the water column increases in length. When the prototype was compared to two other instruments that use different techniques to measure clarity (the Secchi disk and turbidimeter), it was found that the three instruments can generally be used interchangeably. Suggestions for future work include refining the transmissometer design and amassing a wider variety of data to clarify the instrument relationships.

DOES ADAPTIVE ENVIRONMENT-PHENOTYPE MATCHING IN COURTSHIP SONG PERFORMANCE TRANSLATE INTO DIFFERENCES IN MATING SUCCESS?

SURF STUDENT: EMMA PEREZ

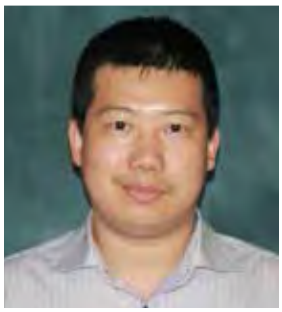
FACULTY MENTOR: TONY FRANKINO

DEPARTMENT: BIOLOGY & BIOCHEMISTRY

Developmental temperature induces wing phenotype variation in *Drosophila*; warm-reared larvae develop disproportionately small wings as compared to those reared in cool temperatures. In addition to flight, males use their wings to produce a courtship song; thus, rearing temperature may affect male fitness by influencing mating success. Earlier work in our lab demonstrated interactions between developmental and singing temperature on song production; *Drosophila* males were able to produce the courtship songs most preferred by females at the male's rearing temperature. A series of experiments were conducted aimed at determining if this temperature-dependent courtship song production affects male mating success, and the degree to which female developmental temperature may influence male mating success. It was found that different metrics of mating success (e.g., latency to copulation, number of copulation attempts) exhibited different patterns of interactions between male rearing environment, female rearing environment and performance temperature. The results indicate a complex relationship among rearing environment, performance and mate choice that may help explain the large standing genetic variation in these traits.

DEVELOPMENT OF A REDOX FLOW BATTERY TESTING PLATFORM FOR MATERIAL EVALUATION

SURF STUDENT: DAVID PINEDA
FACULTY MENTOR: YAN YAO
DEPARTMENT: ELECTRICAL & COMPUTER ENGINEERING



With increasing global demand for energy, the implementation of renewable energy resources has emerged as necessity to meet present energy needs while reducing the environmental effects of non-renewable energy production. Due to their inherited unpredictability and lack of consistency, renewable resources cannot be successfully dispatched into the current grid without causing destabilization. Energy storage systems are thus needed to balance the discrepancy between demand and supply. Among these energy storage systems, Redox Flow Batteries (RFB) have become viable solutions to the energy storage needs. RFB are electrochemical systems that store energy into two electrolyte solutions containing distinct redox couples. These electrolytes are pumped into a central cell, where redox reactions take place to produce or store energy. The problem facing these systems is the high cost of production due to expensive materials needed for operation. The objective of this project was to design and develop a working testing platform for future research on novel and inexpensive electrolyte materials. Vanadium redox couples, initially in the form of Vanadyl Sulfate Hydrate dissolved in sulfuric acid, were used as negative and positive electrolytes. A no-gap cell design has chosen comprising of ElectroPhen flow frames, Carbon Paper electrodes and Nafion 117 ion selective membranes to optimized performance. Charge-Discharge cycles under constant current were performed to evaluate performance and repeatability of system.

IMAGING AND ELECTROPHYSIOLOGICAL CHARACTERIZATION OF CORTICAL SPREADING DEPRESSION

SURF STUDENT: VARUN POTLURI
FACULTY MENTOR: JOKŪBAS ŽIBURKUS
DEPARTMENT: BIOLOGY & BIOCHEMISTRY

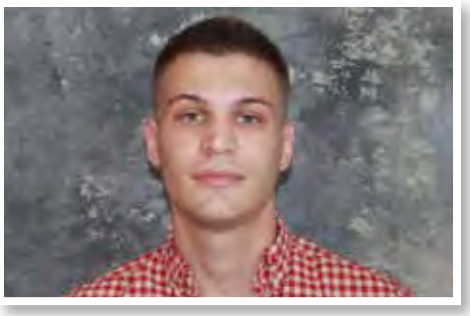
Cortical spreading depression (CSD) is a slowly propagating neuronal activity wave in the cerebral cortex. This phenomenon has been implicated as the mechanism of neurological conditions as migraines, post-stroke and post-traumatic neural injuries. To date, spatiotemporal patterns of neural network depolarizations and intracellular ionic shifts during CSD remain experimentally unobserved, yet computationally rigorously modeled. In the present study, cortical brain slices from juvenile rats were used; spatiotemporal patterns of CSD were studied using two functional imaging modalities: voltage-sensitive and sodium-sensitive dye imaging and electrophysiology. To evoke experimental CSD in the living neural networks, high concentration of potassium chloride (KCl) and hyperthermia were used. CSD activity in the neocortex initiated in the superficial layers and slowly propagated to engulf cortical column-like structures. In addition, preliminary results that suggest that CSD is effectively controlled by ammonium chloride; this is currently being investigated further.

PETROLOGY AND OXYGEN FUGACITY OF RBT04262

SURF STUDENT: STEPHEN POTTER
FACULTY MENTOR: ALAN BRANDON
DEPARTMENT: EARTH & ATMOSPHERIC SCIENCES

RBT 04262, a meteorite from Mars, provides snapshots of Mars' early geological history. Examining the melt inclusions within a crystal provides clues in understanding the geological events that formed this rock. Images were taken with a petrographic microscope to allow identification of the various melt inclusions and minerals. An electron microprobe was used to obtain the elemental compositions of the meteorite. Computational software, the MELTS package, aided in calculating the oxygen fugacity and was used to examine the pathways of crystallization during cooling of the parent magma. This study shows that this meteorite has a complex crystallization history. The melt inclusions show that a magnesium and iron rich magma, which was responsible for the onset of crystallization, then evolved into a more mature, silicon rich magma with less magnesium and iron. With additional study of the trace element composition of the minerals within RBT 04262, a greater understanding of the parent magma, its cooling history, and the source of magma within Mars will be gained.

MODEL FOR PUBLICATION FOR FIRST-TIME WRITERS



SURF STUDENT: ZACHARY POTTS
FACULTY MENTOR: IRVING ROTHMAN
DEPARTMENT: ENGLISH

A collection of poetry was created that can be emulated in concept in the hope of publication for a first-time writer. Through the studying of William Blake, Allen Ginsberg, Roberto Bolaño and Nâzım Hikmet, an original series of pieces was manifested around central themes that are present in the works of the poets, such as religion, politics and cultural identity. The sections of the collection are delineated according to subject matter and the time that the poems penned. Included in the collection is a forward that provides the setting for writing, such as place, time and atmosphere, as well as other information that will be useful to a writer seeking publication. With this project they sought to develop a format that demonstrates the manner in which innovative poems can provide a model for further discovery in poetic totality.

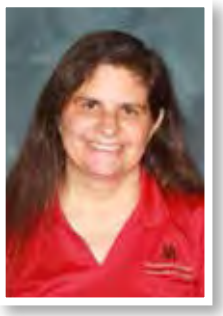
PREDICTING AND FACILITATING INSIGHT IN HUMANS

SURF STUDENT: SIMON POWELL

FACULTY MENTOR: BHAVIN SHETH

DEPARTMENT: ELECTRICAL & COMPUTER ENGINEERING

Insight is the phenomenon by which people spontaneously arrive at a solution to a problem they had attempted that differs qualitatively from plug-and-chug paths. Are there conditions that prime an individual to form insight? Are there physiological signals that correspond to insight and can one alter existing such signals to enhance the probability of insight? Sleep is a behavioral and brain state that aids insight, but the mechanisms by which it does so remains unknown. This question was investigated developing their own experimental tasks from scratch and using cutting-edge eye tracking and impedance cardiography and generated an unprecedented variety of data from a single experiment. The subjects were presented with a series of problems requiring insight to solve before, and after an 8 hour period under sleep, or sleep-deprived conditions, measured insight.



OPTIMIZATION OF PROTEIN EXTRACTION AND ELISA PROTOCOL FOR ACCURATE DETECTION OF CYTOKINES IN THE BRAIN

SURF STUDENT: AIAT RADWAN

MENTORS: ANNA NEWMAN, ADAM WALKER

DEPARTMENT/AFFILIATE: BIOLOGY & BIOCHEMISTRY/DEPARTMENT OF SYMPTOM RESEARCH, UT MD ANDERSON CANCER CENTER

Cancer treatment leads to increases in pro-inflammatory cytokines in the brain, which is linked to symptoms of sickness and treatment outcome. Understanding the cytokine mechanisms involved is vital for patient recovery. Enzyme-Linked Immunosorbant Assays (ELISAs) are commonly used to quantify brain cytokines, but they are inaccurate. The myelin sheath may cause this inaccuracy by increasing non-specific binding. Therefore, this study aims to determine if myelin causes these inaccuracies and to optimize the ELISA protocol. Unmylinated neonatal and myelinated adult brain tissue were collected and processed using sonication in Iscove's homogenizing buffer and tissue glass Dounce homogenization in phosphate buffered saline (PBS) using three brain mass-to-buffer volumes, and samples were spiked with known concentrations of IL-6 and IL-1β. Recovery rate of the cytokine using the standard protocol was poor. Using Dounce homogenization in PBS optimized the results of IL-6 but was worse than Iscove's for IL-1β. Unmyelinated neonatal tissue did produce better recovery rates, but there are other factors contributing to this poor recovery.

BEHAVIORAL EFFECTS OF CPA ON DRAVET SYNDROME

SURF STUDENT: CARA RIFFE
FACULTY MENTOR: JOKŪBAS ŽIBURKUS
DEPARTMENT: BIOLOGY & BIOCHEMISTRY

Severe myoclonic epilepsy in infancy, commonly known as Dravet syndrome (DS), is a severe and intractable form of childhood-onset epilepsy. Affected children suffer from recurrent seizures and cognitive and social dysfunctions. A mouse model of DS was used that tested the hypothesis that blocking early life seizures can also improve social and learning abilities. Previous work in the lab has established that adenosine A1 receptor agonist CPA is effective at blocking seizures and rebalancing neural network activity. This study conducted several behavioral tests and showed that DS mice have a tendency to exhibit hyperactivity and a trend to be less socially interactive. It was further discovered that continuous treatment with CPA does not affect WT animals' learning and social behaviors. Further testing is in process to determine if CPA treatment can improve social interactions in DS mice.

THE HOMER MULTITEXT PROJECT

SURF STUDENT: CHRISTOPHER RIVERA
FACULTY MENTOR: CASEY DUÉ HACKNEY
DEPARTMENT: MODERN & CLASSICAL LANGUAGES

Recent scholarship proposes that the *Iliad* is the product of centuries of oral composition in performance by countless composers. Although the poetry is highly traditional, each performance would have been unique. While the *Iliad* crystalized over time and was transmitted in manuscripts, variations exist and there is no one true *Iliad*. The Venetus A is a 10th century CE Byzantine manuscript of the *Iliad*, the oldest complete edition we have. The margins contain numerous 'scholia' or commentaries from ancient Greek scholars, making the manuscript an invaluable source of information about the ancient oral tradition. The Venetus A currently resides in Venice, but through special permission the Homer Multitext Project was allowed to photograph this important document and upload the images online for all to see. The Homer Multitext Project is designed so that individuals can transcribe and hyper-link the images in order to present the textual transmission of an oral tradition.

LIVING WITH ARTHRITIS

SURF STUDENT: RICHARD RODRIGUEZ
FACULTY MENTOR: QIAN LU
DEPARTMENT: PSYCHOLOGY

The Centers for Disease Control and Prevention (CDC) reports that 50 million (1 in 5) Americans have physician-diagnosed arthritis. Fully half of arthritis patients suffer from Arthritis-Attributable Activity Limitation (AAAL), making it the leading cause of disability within the United States. Not only is arthritis burdensome to the patients, but it also comes with a high economic cost. In 2003, the economic cost of arthritis and other rheumatic conditions (AORC) was $128 billion dollars, or 1.2% of the 2003 U.S. gross domestic product! The medical costs ($80 billion) accounted for 4.7% of all health care expenditures in 2003. Arthritis affects people differently, not only physically but also socially, emotionally, and spiritually. As a two phase study, it was attempted to not only see who is impacted and how, but also what biopsychosocial-spiritual factors are related over time to the individuals' health. This information may lead to improved physician-patient interaction, treatment, and focus of research.

DEVELOPMENTAL CHANGES IN CHILDREN'S SPEECH

SURF STUDENT: DEIDRE RUIZ
FACULTY MENTOR: MARTHA DUNKELBERGER
DEPARTMENT: COMMUNICATION SCIENCES & DISORDERS

The goal of this project was to test the effectiveness of the Houston Sentence Imitation Test of Articulation (H-SITA) in typically developing participants between the ages of four and five. The H-SITA is a test designed to probe a child's production of specific phonemes in continuous speech through sentence imitation. The H-SITA allows the SLP to have a controlled set of phonemes, presented in a sentence imitation task, tailored to the client's individual needs. This allows the SLP to accomplish her goals and provide a more accurate transcription, while retaining control for sampling of phonemes, phonological processes, and word shapes.

PGIS Overexpression and Behavior

2013 Biology of Behavior Institute (BoBI) Scholar

SURF Student: Monika Schmitt
Faculty Mentor: Jason Eriksen
Department: Pharmacological & Pharmaceutical Sciences

Prostacyclin is an eicosanoid made by endothelial cells. It has many known functions including playing a role in angiogenesis, the growth of new blood vessels, and cardiovascular health. Despite two decades of research, the role of prostacyclin in aging, behavior, and brain health is unknown. Prostacyclin synthase (PGIS) is the enzyme that produces prostacyclin. In this study, a mouse model was used containing a modified human PGIS gene; this model overexpresses PGIS, resulting in elevated prostacyclin expression. The goal of this project was to characterize the behavior of these PGIS mice at 13-17 months of age. Major conclusions from the study were that PGIS overexpression increased anxiety-like behavior, negatively affected learning and memory in both short and long-term context trials, and increased motor performance.

The Effects of Synchronized Exhalation on Knee Extensor Muscle Strength and Endurance

SURF Student: Donovan Schreiber
Faculty Mentor: Adam Thrasher
Department: Health & Human Performance

Chronic muscle weakness is a common problem following stroke. Recent evidence from clinical studies suggests a neurological connection between breathing and muscle fiber activation. It was suggested that strength training with synchronized breathing will significantly increase muscle strength and endurance. Participants are grouped randomly to either: Conventional Training (CT) or Synchronized Breathing (SB). Participants perform twelve strength training sessions. Participants perform three sets of isotonic knee extensions using resistance of approximately 85% of their maximal voluntary contraction (MVC). SB group participants are instructed to inhale deeply and exhale sharply during knee extensions. Isometric strength and endurance of the knee extensor muscles are evaluated pre- and post-training using a dynamometer (Biodex 3). Muscle endurance is assessed by timing how long participants can sustain an isometric knee extension at 50% of their MVC. If successful, the results will suggest improved strategies for strength training in clinical populations who suffer from chronic muscle weakness.

TRANSATLANTIC WISDOM: A STUDY OF SPANISH IDIOMS AND PROVERBS

SURF STUDENT: MANENDRA SHARMA
FACULTY MENTOR: GUILLERMO DE LOS REYES
DEPARTMENT: HISPANIC STUDIES

Language has altered over different lands and each dialect now has a distinct feature. An indicator of this change is usually mirrored in idioms and proverbs, their meanings and their interpretations, which give an insight into how people of a culture perceive certain situations and choose to express it. This study was focused on revealing the cross-cultural meanings and interpretations of commonly used as well as scarcely used Spanish idioms in Cadiz, Spain and Houston, Texas. The aim of this study was to a conduct comparative analysis of these idiomatic expressions in order to identify the differences and similarities by surveying the local population in Cadiz and Houston; and determining the impact of geographical location on how idioms and proverbs are comprehended. This study presents the quantitative and qualitative data analyzed to demonstrate the importance of cross-linguistic idioms and expressions communicated colloquially among English and Spanish speakers.

INCREASING THE EFFICIENCY OF CUAAC REACTION IN LIVING CELLS

SURF STUDENT: DEMA SHOBAKI
FACULTY MENTOR: CHENGZHI CAI
DEPARTMENT: CHEMISTRY

Research has been conducted on the application of copper^{I}-catalyzed azide-alkyne cycloaddition (CuAAC) in live cells. In order to improve the reaction efficiency and biocompatibility, a new generation of CuI-binding ligand conjugated to cell-penetrating peptide Tat was designed. The fast CuAAC reaction kinetics catalyzed by our synthesized ligand was confirmed by the measurement of mean fluorescence intensity using a fluorogenic CuAAC reaction. Our ligand demonstrated a two-fold rate enhancement in comparison to the reported most efficient ligand to date. The Cu^{I}-ligand dissociation constant (K_D) was measured using the competition assay with bicinchonicic acid (Bca), with our ligand showing a relatively stronger Cu^{I}-binding affinity. The stronger Cu^{I}-binding affinity suggests a more stabilized CuAAC catalyst in live cells. An intracellular CuAAC reaction was then demonstrated with the utilization of our new ligand.

THE ROLE OF MELK IN TRIPLE NEGATIVE BREAST CANCER

SURF STUDENT: MARISA SIMON
FACULTY MENTOR: CECILIA WILLIAMS
DEPARTMENT: BIOLOGY & BIOCHEMISTRY

Breast cancer is the second leading cause of cancer deaths in women. Roughly 15 percent of those deaths occur from the triple-negative breast cancer (TNBC) subtype. TNBC has negative status for each of the three receptors that are used for clinical diagnosis and targeted treatments. TNBC is highly metastatic, has the highest rate of reoccurrence, affects younger women and has a poor prognosis. The need to design a targeted treatment is critical, and the maternal embryonic leucine-zipper kinase (MELK) is identified as a potential target for treatment. MELK is upregulated in undifferentiated aggressive cancers and appears to have important roles in cancer. In order to explore its role in TNBC we used siRNA or inhibitor to inactivate MELK *in vitro* in the MDA-MB-231 TNBC cell line. Subsequently, RNA and protein were quantified and the results indicated that siRNA did not affect protein levels. MTS assays confirmed that the inhibitor lowered proliferation rate. Microarrays were performed with the inhibitor to start to dissect the pathways affected by MELK inhibition.

TXTILE

SURF STUDENT: FRANCESCA SOSA
FACULTY MENTOR: GREGORY MARINIC
DEPARTMENT: INTERIOR ARCHITECTURE

Pollution has been a constant problem since the Industrial Revolution, however, never typically a concern associated with building interiors. Today, because preventive measures have not been taken to prevent pollution it has become one of our biggest concerns, not only for engineers but also for architects. One of the products of that pollution is harmful Volatile Organic Compounds (VOC's). Organic Compounds are chemicals that contain carbon and are found in all living things and Volatile Organic Compounds are organic compounds that easily become vapors or gases. Materials like Electrospun Polyurenthane Fibers have been developed to counter act these VOC's but according to the research the most effective is a gypsum board developed by Certainteed, which captures and transforms the VOC's into inert compounds. The goal of this project was to develop a design incorporating this technology.

ELASTIC WAVE PROPAGATION

SURF STUDENT: MATT STANULONIS
FACULTY MENTOR: DONALD KOURI
DEPARTMENT: PHYSICS

Numerical simulations were examined of the time dependent, 3-D, Elastic Wave equation in a homogenous medium. The simulations were based on a new technique derived by Dr. Kouri. Using several different finite difference models, this new technique was compared to classical finite difference methods. Using this method, the wave propagation in an isotropic model was compared to one where stresses are uneven. This method was also exploited to produce time-reversed models where the waves move backwards revealing their starting point. The new method was found to agree with the classical finite difference method within a .5% error as far as 1000 meters from the source. With these results it is expected this method will become a valuable tool for understanding elastic wave propagation, improving subsurface imaging, and locating microseismic events.

LOOK-AHEAD SCHEDULING FOR ELECTRICAL CONTRACTORS, BEST PRACTICE DESIGN AND FIELD CASE STUDY

SURF STUDENT: ERIC TALLEY
FACULTY MENTOR: LINGGUANG SONG
DEPARTMENT: CONSTRUCTION MANAGEMENT

Due to unique challenges faced by electrical contractors, poor scheduling practices often lead to low productivity levels. Industry feedback indicates that an effective look-ahead scheduling model can increase contactor's productivity. A literature review and an industry survey were used to identify areas to be addressed in the best practice. Once developed, a field case study was conducted to test the viability of the scheduling model. Survey results indicated that contractors would benefit from a look-ahead scheduling best practice based on work packaging, constraint tracking, trade collaboration and performance tracking. In real world testing, the best practice received favorable reviews and led to an increase in crew productivity and overall project manageability. Implementation of a look-ahead scheduling model tailored to fit the specific needs of electrical contractors can lead to higher levels of productivity and project performance.

ANHARMONIC ANALYSIS OF MONTHLY MEAN SUNSPOT DATA

SURF STUDENT: DYLAN THOMPSON
FACULTY MENTOR: GORDON JOHNSON
DEPARTMENT: MATHEMATICS

The Maunder Minimum is an event that occurred roughly between the years 1645 to 1715 AD. During this period, the sun showed very few sunspots on its surface and the Earth experienced a significant drop in global temperatures. Evidence has shown that several other minimums have occurred in the past, and may happen again. Because these minimums in solar activity have such a dramatic effect on Earth's climate, a way to predict the future occurrence of one of these minimums would be invaluable. Monthly mean sunspot counts, gathered and maintained by the NOAA, give us a record of the sun's past activity. In A. K. Paul's 1972 paper Anharmonic Frequency Analysis, Paul presents a technique of signal analysis that is superior to traditional techniques. In this study, A. K. Paul's method of frequency analysis was applied to the NOAA sunspot data, in order to discover patterns in sunspot activity on the sun; the objective was to use those patterns to construct a prediction of solar activity. The well known 11 year periodicity is observed here in the analysis and lesser known eight and five year periodicities are also discovered. A 10 year prediction was made based on the analysis of the sunspot data.

THE HOMER MULTITEXT PROJECT

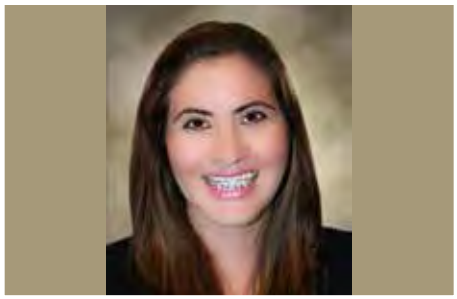
SURF STUDENT: MEGAN TRUAX
FACULTY MENTOR: CASEY DUÉ HACKNEY
DEPARTMENT: MODERN & CLASSICAL LANGUAGES

Recent scholarship proposes that the *Iliad* is the product of centuries of oral composition in performance by countless composers. Although the poetry is highly traditional, each performance would have been unique. While the *Iliad* crystalized over time and was transmitted in manuscripts, variations exist and there is no one true *Iliad*. The Venetus A is a 10th century CE Byzantine manuscript of the *Iliad*, the oldest complete edition we have. The margins contain numerous 'scholia' or commentaries from ancient Greek scholars, making the manuscript an invaluable source of information about the ancient oral tradition. The Venetus A currently resides in Venice, but through special permission the Homer Multitext Project was allowed to photograph this important document and upload the images online for all to see. The Homer Multitext Project is designed so that individuals can transcribe and hyper-link the images in order to present the textual transmission of an oral tradition.

URBANIZATION OF SOUTHEAST ASIA: SINGAPORE – JOHOR BAHRU

SURF STUDENT: ALEX WEI
FACULTY MENTOR: WILLIAM TRUITT
DEPARTMENT: ARCHITECTURE

This research looks at the relationship of two cities: the city-state Singapore and Johor Bahru, Malaysia. Johor Bahru is often seen as an informal extension of Singapore. However, it is undergoing a massive urbanization project that seeks to rival its neighboring city. This research maps historical and current density, industry, and population data, creating a layered map that can be updated and altered over time to document the urban pattern, revealing an ongoing relationship between each city. The result is a basis for potential long-term urban studies, demonstrating that land availability and ease of space and infrastructure will lead Malaysia to develop at a faster rate than Singapore, becoming the dominant trade city in the future.



PRODUCTION OF VOWELS BY CHILDREN WITH COCHLEAR IMPLANTS

SURF STUDENT: PATRICIA WILLIAMS
FACULTY MENTOR: FERENC BUNTA
DEPARTMENT: COMMUNICATION SCIENCES & DISORDERS

The aim of this research is to compare the patterns of English vowels in stressed position produced by young monolingual and bilingual children who have a hearing loss and use cochlear implants (CIs). The main question is whether bilingual children with CIs develop their English vowels at a rate commensurate with their monolingual peers who also use CIs. Twenty young, Spanish- and English-speaking children and their monolingual English-speaking peers, who were matched in age and CI use, will participate in the study. The independent variable is language status; the dependent variables include various vowel analyses such as first and second formant and vowel duration. It is expected to find bilingual children's vowel production accuracy matches their monolingual peers'.

FOOD INTAKE SIMILARITIES AND DIFFERENCES AMONG FOOD INSECURE HOUSEHOLDS

SURF STUDENT: BOSTON YODER
FACULTY MENTOR: DAPHNE HERNANDEZ
DEPARTMENT: HEALTH & HUMAN PERFORMANCE

Food insecurity is defined as insufficient access to adequate food needed to maintain an active, healthy life because of lack of money or other resources for food. Food security is based on a scale developed by the USDA that assesses the quality and quantity of food consumed over one year, along with assessing the fear of running out of food. A food insecure household can be further classified as low food secure (LFS) or very low food secure (VLFS). A low food secure household is where individuals have little or no indication of reduced quantity of food, but do have reduced quality and variety of their diet. Very low food secure individuals indicate signs of both reduced quality *and* quantity of food, and often show disrupted eating patterns due to financial hardship. The aim of this project was to investigate the food intake similarities and differences among low food secure and very low food secure households. The study also aimed to investigate the demographic similarities and differences among the different levels of food insecurity. As it was predicted, there were differences between the LFS and VLFS groups, as well as demographic differences among the different levels of food security.

RNAI TARGETING THE *DOPAMINE 2-LIKE RECEPTOR* IN BBB AFFECTS COURTSHIP BEHAVIOR IN *DROSOPHILA*

SURF STUDENT: MAZEN ZAIBAK
FACULTY MENTOR: BRIGITTE DAUWALDER
DEPARTMENT: BIOLOGY & BIOCHEMISTRY

2013 Biology of Behavior Institute (BoBI) Scholar

Drosophila courtship behavior is a complex behavior that has been studied since the early 1900's. It is the behavior that mature virgin males display when he encounters a virgin female. The Dauwalder Lab uses Molecular Genetics to identify the genes and processes that regulate this behavior. An exciting aspect is their recent finding of the involvement of the blood brain barrier (bbb). The bbb separates the brain from male-specific circulatory factors that need to "talk" to the brain to regulate the behavior. A genomic approach has show that interestingly, the bbb contains male-specific factors also. One of them is the *Dopamine 2-like receptor* (D2R), a G protein coupled receptor. To test the role of D2R in courtship, the mRNA was knocked down of the receptor specifically in the bbb using RNAi throughout development. It was found that this severely affects courtship behavior. A conditional approach was then used to knock down the mRNA in adults only. This still results in a courtship defect, indicating an adult, physiological role of the receptor. Thus, these experiments have demonstrated an important role of the D2R receptor in the bbb. Future experiments will address how D2R in the bbb influences the brain courtship circuits.

SURF 2013 Brown Bag Lecture Series

Week 1
SURF Meet-and-Greet Event
Wednesday, June 5th, 2013
First opportunity to get to know fellow SURFers

Week 2
Research Ethics
Wednesday, June 12th, 2013
Lecture by **Dr. Jeremy May**, Department of Chemistry

Research Tour: Laboratory for Noninvasive Brain-Machine Systems
Friday, June 14th, 2013
With **Dr. Jose L. Contreras-Vidal**, Department of Electrical & Computer Engineering

Week 3
Considering and Applying to Graduate and Professional School
Wednesday, June 19th, 2013
Faculty round table discussions

Research Tour: Center for Nuclear Receptors and Cell Signaling
Friday, June 21st, 2013
With **Dr. Daniel Frigo**, Department of Biology & Biochemistry

Week 4
Student Research Panel
Wednesday, June 26th, 2013
Undergraduates and recent graduates share their research experiences

Week 5
No Lecture Scheduled
Wednesday, July 3rd, 2013

Week 6
Cross-Disciplinary Research: Ground Water Flow, Risk Assessment, and Urban Storm Water Quality
Wednesday, July 10th, 2013
Lecture by **Dr. Hanadi Rifai**, Department of Civil & Environmental Engineering

Week 7
Developing Effective, Eye-Catching Résumés
Wednesday, July 17th, 2013
Lecture by **Becky Reiter**, University Career Services

Research Tour: Hilton College of Hotel and Restaurant Management
Friday, July 19th, 2013
With **Dr. Jay Neal**

Week 8
Terrestrial Laser Scanning Targets
Wednesday, July 24th, 2013
Lecture by **Professor Craig Glennie**, Department of Civil & Environmental Engineering

Week 9
Creating a Research Poster
Wednesday, July 31st, 2013
Lecture by **Karen Weber**, Office of Undergraduate Research

Week 10
Final SURF Luncheon
Wednesday, August 7th, 2013
End of summer luncheon with mentors, Welcome by **President Renu Khator**

Student Presenters

Assistive Game Development to Provide Applied Behavior Analysis Training for Children with Autism Spectrum Disorder

Student Researcher: Sabah Akbani

Mentor: Chang Yun

Department: Computer Science

Biochemical Changes in the Brain in Response to Social Stress and Treadmill Exercise in Rats

Student Researcher: Amber Ansari

Mentor: Samina Salim

Department: Pharmacological & Pharmaceutical Sciences

Unmanned Aerial Vehicle

Student Researcher: Jed Ryan Avanzado

Mentor: Mequanint Moges

Department: Engineering Technology

The Use of Social Media to Achieve Weight Loss Goals

Student Researcher: Elizabeth Ayoko

Mentor: Norma Olvera

Department: Educational Psychology

Temperature of the Quark-Gluon Plasma in Comparison to the LCQD and Center of the Sun

Student Researcher: Macy Baig

Mentor: Anthony Timmins

Department: Physics

Footwear Design Development

Student Researcher: Cody Blazek

Mentor: EunSook Kwon

Department: Industrial Design

Student Presenters

Differential Toxicity of Cholera Toxin and E.Coli Enterotoxin Explored Using Molecular Dynamics Simulations

Student Researcher: Lindsey Brier

Mentor: James Briggs

Department: Biology & Biochemistry

Temperature Dependent Senescence of Flight Performance of *Drosophila melanogaster*

Student Researcher: Larry Broome

Mentor: Tony Frankino

Department: Biology & Biochemistry

pK_A and Electrostatic Potential Analysis of Matrix Metalloproteinase 9 (MMP-9)

Student Researcher: Juliette Cao

Mentor: James Briggs

Department: Biology & Biochemistry

A Comparison of Social Media and Traditional Journaling Logs to Achieve Fitness Goals in Hispanic Mothers

Student Researcher: Arely Cervantes

Mentor: Norma Olvera

Department: Educational Psychology

Electronic Safety and Monitoring System for Handguns

Student Researcher: Ryan Clark

Mentor: Mequanint Moges

Department: Engineering Technology

Student Presenters

Ambient Silhouette

Student Researcher: Minelya De Leon

Mentor: Gregory Marinic

Department: Interior Architecture

Suppressing Vibrations in a Coupled Spring and Mass System

Student Researcher: Huy Dinh

Mentor: Daniel Onofrei

Department: Mathematics

Project Patriotism: Homes for Veterans

Student Researcher: Tracy Do

Mentors: Charles Guez, Colleen Davies

Department: Finance

Aggregated Growth: topoCouture-Wall System

Student Researcher: Joseph Matthew Echavarria

Mentor: Gregory Marinic

Department: Interior Architecture

AquaSMART: Intelligent Control System

Student Researcher: Enobong Eduok

Mentor: Mequanint Moges

Department: Engineering Technology

Decentralization and Conflict: The Missing Link in State Capacity Literature

Student Researcher: Derick Fan

Mentors: Ryan Kennedy, John Ishiyama

Department/Affiliate: Political Science/University of North Texas

Student Presenters

Free Energy Landscape of Aggregation-Prone Protein U1A

Student Researcher: Lionel Flores
Mentors: Margaret Cheung, Weihua Zheng
Department/Affiliate: Physics/Rice University

Unmanned Aerial Vehicle

Student Researcher: Justin Fong
Mentor: Mequanint Moges
Department: Engineering Technology

A Numerical Study of Anomalous Localized Resonance

Student Researcher: Gregory Funchess
Mentor: Daniel Onofrei
Department: Mathematics

A Timeline of Healthcare in the U.S. From 1900s to 2000s

Student Researcher: Michele Gaddis
Mentor: Jaye Ramsey Sutter
Department: Political Science

Layered Transitions: Spatial Organization in Interior Transitions

Student Researcher: Jessica Garrett
Mentors: Gregory Marinic, Michael Gonzales
Department: Interior Architecture

(re)Fashioning Structure: Restriction and Enhancement of the Spinal Movement

Student Researcher: Arianne Gonzato
Mentors: Michael Gonzales, Meg Jackson
Department: Interior Architecture

Student Presenters

The Importance of Specific Residue Interactions in Calmodulin's Initial Target Binding

Student Researcher: Jonathan Hankin

Mentor: Margaret Cheung

Department: Physics

Healthy Beginnings: Communication Design for Pediatrics and Child Development

Student Researcher: Martha Hernandez

Mentor: EunSook Kwon

Department: Industrial Design

Urban Cocoon

Student Researcher: Henry Ho

Mentor: Michael Gonzales

Department: Interior Architecture

Electronic Safety and Monitoring System for Handguns

Student Researcher: Brian Hoffart

Mentor: Mequanint Moges

Department: Engineering Technology

Structured Chaos: Adaptive Shading Intervention Flower Fields

Student Researcher: Joshua Hollie

Mentor: Gregory Marinic

Department: Interior Architecture

Student Presenters

Therapeutic Potential Targeting Prostate Cancer Stem Cell-Cell Interaction

Student Researcher: Ambreen Iqbal

Mentor: Ke-He Ruan

Department: Pharmacological & Pharmaceutical Sciences

Pixelated Projection: Diagramming and Developing a Construction Methodology

Student Researcher: Emily Keller

Mentor: Gregory Marinic

Department: Interior Architecture

Aggregated Growth: topoCouture-Wall System

Student Researcher: Roni Kop

Mentor: Gregory Marinic

Department: Interior Architecture

Hydrocarbon Microseepage and Geobotanical Anomalies

Student Researcher: Diana Krupnik

Mentor: Shuhab Khan

Department: Earth & Environmental Science

AquaSMART: Intelligent Control System

Student Researcher: Peter Kuo

Mentor: Mequanint Moges

Department: Engineering Technology

Resting-State Functional Connectivity in Depression Patients

Student Researcher: Tessy Lal

Mentors: Dave Shattuck, Ramiro Salas

Department/Affiliate: Electrical & Computer Engineering/Psychiatry/ Baylor College of Medicine

Student Presenters

Aggregated Erosion: Performative Design Through Rhythmic Fabrication

Student Researcher: Jonathan Lampson

Mentors: Gregory Marinic, Michael Gonzales

Department: Interior Architecture

Toughening Polylactide with Blends of Acrylated Epoxidized Soybean Oil and Soybean Oil

Student Researcher: Kim Mai Le

Mentor: Megan Robertson

Department: Chemical & Biomolecular Engineering

Educational Needs of Cancer Survivors' Caregivers

Student Researcher: Christina Leong

Mentors: Joel Bloom, Guadalupe Palos

Department/Affiliate: Educational Psychology/MD Anderson Cancer Center

Unmanned Aerial Vehicle

Student Researcher: Adrienne Low

Mentor: Mequanint Moges

Department: Engineering Technology

Using Engineered Inflammatory Cell Model for Developing of Specific Anti-inflammatory Drugs

Student Researcher: Evan Lucas

Mentor: Ke-He Ruan

Department: Pharmacological & Pharmaceutical Sciences

Student Presenters

Flower Fields

Student Researcher: Cecilia Mejia

Mentor: Gregory Marinic

Department: Interior Architecture

The Role of DiGeorge Syndrome Critical Region 8 and microRNA Biogenesis in the Developing Neural Ectoderm of *Xenopus laevis*

Student Researcher: Kimberly Melara

Mentor: Amy Sater

Department: Biology & Biochemistry

Computational Docking and Analysis of A Peptide Linked Inhibitor of Rho Associated Kinase

Student Researcher: Jeffrey Mindrebo

Mentor: James Briggs

Department: Biology & Biochemistry

What Contributes to Memory Problems in Individuals with Amyotrophic Lateral Sclerosis?

Student Researcher: Hira Mirza

Mentors: Paul Massman, Mario Dulay

Department/Affiliate: Psychology/Houston Methodist at Texas Medical Center

On the Development of Integrated Antennas for the Cube Satellite

Student Researcher: Ramón Montaño

Mentor: David Jackson

Department: Electrical & Computer Engineering

Student Presenters

Effects of Efficiency in Carbon Heavy Industries and Understanding the Limitations of the CIM-EARTH Trade Model

Student Researcher: John Moosemiller

Mentors: Joseph Pratt, Alison Brizius, Michaela Carey

Department/Affiliate: Energy & Sustainability/University of Chicago

Healthy Beginnings: Communication Design for Pediatrics and Child Development

Student Researcher: Elizaveta Morris

Mentor: EunSook Kwon

Department: Industrial Design

Characterization of Behavioral Deficiencies in Fmr1-knockout Female Mice

Student Researcher: Stacy Nguy

Mentor: Maria Tejada-Simon

Department: Pharmacological & Pharmaceutical Sciences

Monte Carlo Simulations of Crystallization in Pentomino Fluids

Student Researcher: Khanh Nguyen

Mentors: Donna Stokes, Lev Gelb

Department/Affiliate: Physics/University of Texas at Dallas

Associations of Red Meat and Fruit and Vegetable Consumption with Colorectal Cancer Screening among African Americans

Student Researcher: Minh-Anh Nguyen

Mentor: Lorraine Reitzel

Department: Educational Psychology

Student Presenters

Electronic Safety and Monitoring System for Handguns

Student Researcher: Christopher Nix

Mentor: Mequanint Moges

Department: Engineering Technology

The Role of Attentional Control and Working Memory in Conservation Task Performances

Student Researcher: Staci Ouch

Mentor: Hanako Yoshida

Department: Psychology

Unmanned Aerial Vehicle

Student Researcher: Alexander Rios

Mentor: Mequanint Moges

Department: Engineering Technology

Reconfiguring the Urban Mosaic of Houston

Student Researcher: Francisco Salas

Mentor: Michael Gonzales

Department: Interior Architecture

AquaSMART: Intelligent Control System

Student Researcher: Karam Salih

Mentor: Mequanint Moges

Department: Engineering Technology

Sleep Deprivation: How Insufficient Sleep Affects Safety in the Workplace

Student Researcher: Surizaday Serrano

Mentor: Christiane Spitzmueller

Department: Psychology

Student Presenters

Dynamic OCT Measurements of Elastic Wave Propagation in Tissue Mimicking Phantoms and Mouse Cornea *in vivo*

Student Researcher: Manmohan Singh

Mentor: Kirill Larin

Department: Biomedical Engineering

Aggregated Silhouette: A Spatial, Performative, and Social Interior for a Skybridge Ambient Silhouette

Student Researcher: Ana Cristina Sotelo

Mentor: Gregory Marinic

Department: Interior Architecture

Discrete Calculus on a Scaled Number Line

Student Researcher: Sarah Stanley

Mentors: William Ott, Allan Peterson

Department/Affiliate: Mathematics/University of Nebraska-Lincoln

Does Mother's Work Habits Effect Children's Behavior?

Student Researcher: Rissa Thomas

Mentor: Christiane Spitzmueller

Department: Psychology

Unmanned Aerial Vehicle

Student Researcher: Sony Thomas

Mentor: Mequanint Moges

Department: Engineering Technology

AquaSMART: Intelligent Control System

Student Researcher: Shirdora Thompson

Mentor: Mequanint Moges

Department: Engineering Technology

Student Presenters

Electronic Safety and Monitoring System for Handguns

Student Researcher: Erick Torres

Mentor: Mequanint Moges

Department: Engineering Technology

Electronic Safety and Monitoring System for Handguns

Student Researcher: Andy Tran

Mentor: Mequanint Moges

Department: Engineering Technology

Conjugate Addition of Boronic Acids to Vinylogous Esters

Student Researcher: Tho Tran

Mentor: Jeremy May

Department: Chemistry

Dynamics of microRNA Involved Repressilator Gene Regulation Circuit

Student Researcher: Tristan Walker

Mentors: Margaret Cheung, Mingyang Lu

Department/Affiliate: Physics/Rice University

Healthy Beginnings: Communication Design for Pediatrics and Child Development

Student Researcher: Troy Zinsmeister

Mentor: EunSook Kwon

Department: Industrial Design

Office of Undergraduate Research

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 UndergraduateResearch.uh.edu/purs.

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. 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 UndergraduateResearch.uh.edu/surf.

THE SENIOR HONORS THESIS is a capstone program for a 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. 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. For more information, visit the thesis website at UndergraduateResearch.uh.edu/thesis_guidelines.

HOW TO GET STARTED IN RESEARCH

- 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, UndergraduateResearch.uh.edu/facultyresearch.
- Join the UH Undergraduate Research **Facebook** page and/or the Office of Undergraduate Research's list serve. You will receive postings 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.

Nationally Competitive Scholarships

The Honors College and The Office of Undergraduate Research assist students in finding and applying for nationally competitive scholarships. These are awards that require university endorsement to apply. Visit uh.edu/honors/undergraduate-research/scholarships/index.php for a comprehensive listing.

BARRY M. GOLDWATER SCHOLARSHIP

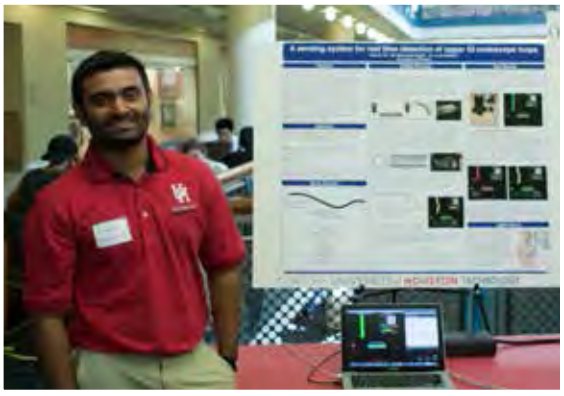
The Goldwater Scholarship is awarded to outstanding sophomores and juniors interested in pursuing a research career in science, math, or engineering. Each scholarship covers eligible expenses for tuition, fees, books, and room and board up to a maximum of $7,500 annually. Regarding eligibility, candidates must be full-time sophomores or juniors at the time of application, be a U.S. citizen, natural or resident alien, and have at least a 3.7 gpa. Strong candidates should have at least three months of prior research experience. Candidates must be nominated by UH and may not apply directly. **The UH Goldwater application deadline is December 2, 2013, and the national deadline is January 31, 2014.** For more specific information, visit the Goldwater website at www.act.org/goldwater.

HARRY S. TRUMAN SCHOLARSHIP

The Truman awards $30,000 scholarships to students who wish to attend graduate school in preparation for careers in public service. Applicants must be full-time juniors intending to graduate in the 2014-2015 academic year and be U.S. citizens or naturals. Applicants should have a strong academic and leadership record and have public service related experiences and goals. Candidates must be nominated by UH and may not apply directly. **The UH campus deadline is December 2, 2013, and the national deadline is February 4, 2014.** For more information, visit the Truman Scholarship website at www.truman.gov.

MORRIS K. UDALL & STEWART L. UDALL SCHOLARSHIP

The Udall Scholarship funds scholarships up to $5000 to sophomores and juniors committed to careers related to the environment, tribal public policy, or Native American health care. Candidates must be enrolled full-time, have at least a 3.0 gpa, and be a U.S. citizen, national, or permanent resident. Candidates must be nominated by UH and may not apply directly. **The campus deadline is February 3, 2014, and the national deadline is March 5, 2014.** For more information, visit www.udall.gov/.



Nationally Competitive Scholarships

PAUL & DAISY SOROS FELLOWSHIPS FOR NEW AMERICANS

The Paul & Daisy Soros Fellowships for New Americans provide opportunities for new Americans to achieve leadership in their chosen fields. Fellows must demonstrate academic excellence, creativity, and commitment to the values of the U.S. Constitution and the Bill of Rights. Graduating seniors and graduate students under 30 years of age may apply. **The deadline is November 8, 2013.** For more information visit www.pdsoros.org/.

NSF GRADUATE RESEARCH FELLOWSHIP

The NSF Graduate Research Fellowship offers funding to undergraduate and graduate students in science, mathematics, engineering, and some fields within the social sciences. Each award provides a $10,500 cost-of-education allowance and a $30,000 stipend. Applicants must be U.S. citizens or nationals, or permanent resident aliens of the United States. **The deadlines vary from November 4-8, 2013 depending on field.** For more information visit www.nsfgrfp.org/.

BOREN AWARDS FOR INTERNATIONAL STUDY

The Boren scholarships and fellowships provide undergraduate and graduate students funding for study abroad programs outside of Western Europe in non-English speaking countries. The program focuses on geographic areas, languages, and fields of study deemed critical to U.S. national security. **The campus deadline is January 24, 2014 and the national deadline is February 5, 2014.** For more information on the Boren Scholarships, visit www.borenawards.org or contact Parul Fernandes at pfernandes@uh.edu.

JACK KENT COOKE GRADUATE ARTS AWARD

The Jack Kent Cooke Foundation's Graduate Arts Award enables graduating seniors and recent alumni with exceptional artistic and creative promise and significant financial need to pursue up to three years of graduate study in the U.S. or abroad. Awards may be as much as $50,000 annually. There are two phases to the application process. **The deadline for Phase One is November 26, 2013**. If you are selected as a semifinalist based on your Phase One application, you will be invited to submit additional information in Phase Two of the application process. Phase Two requires university nomination. **The deadline for Phase Two is February 27, 2014.** For more information visit www.jkcf.org/scholarships/graduate-scholarships/graduate-arts-award/.

ePortfolio
THE HONORS COLLEGE EPORTFOLIO PROGRAM

The Honors College ePortfolio program offers students the opportunity to connect the dots of their education, and provides a forum to reflect upon their undergraduate career. Visit TheHonorsCollege.com/eportfolio for details on this exciting new program.

HOW DOES THE ePORTFOLIO PROGRAM WORK?

Freshmen and Sophomores:

- Request that the ePortfolio link is added to your Blackboard Learn account at TheHonorsCollege.com/eportfolio. This folder is for you to store your files for developing your published, public narrative at a later date. The information within the ePortfolio folder in Blackboard Learn will include recommended sections for your ePortfolio, guidelines on organizing materials, and helpful tutorials, pdfs, and links on developing your site.
- Create and/or archive your reflection pieces, best course papers, leadership and service experiences, employment history, résumés, research activities, and other materials by uploading them into My Portfolios within Blackboard Learn.
- When you are ready to "go live" or make your ePortfolio public, plan to enroll in the one-credit hour HON 4198 ePortfolio course during your junior or senior year.

Juniors and Seniors:

- Enroll in the one-credit hour course: Honors ePortfolio. The one-credit hour ePortfolio course is two-fold in nature. It is a retrospective of a student's Honors education, but also prospective in nature—serving as a preview of what's coming next. Students are guided through the "folio process" of determining how to develop their public ePortfolio profile to share with external constituents. The instructors review the students' reflection pieces and archived materials, and aid them in the process of creating their self-narrative and public ePortfolio profile.

photo from Shutterstock.com

- The program is intended to provide students with the tools necessary to create their own personal and professional narrative. A fully developed portfolio should offer a broader sense of who the student really is, what they have accomplished, and what they hope to achieve.
- A published ePortfolio provides an illustrative forum for faculty letter writers, selection committees for graduate and professional school, and potential employers to learn about the highlights of a student's educational career.

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. We offer the university's finest students the ***best of both worlds***–the community and advantages of a small college together with the resources and rich diversity of a large research university. Our faculty and staff believe that a university education should offer more than the acquisition of skills for the workplace. The Honors College challenges 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 Honors College scholarships, priority course 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 is designed to coordinate with all majors and 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 or creative project.

Contact Information:

Sarah Bhojani, Assistant Director: sabhojani@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@central.uh.edu

Leadership Studies

The minor in Leadership Studies allows students from any major to study leaders and leadership in a variety of contexts. The minor in Leadership Studies provides complementary leadership development opportunities that would include participation in student organization leadership, leadership skills training programs, and community leadership experiences. The minor, therefore, is an important part of the university's effort to provide exposure to leadership for undergraduate students.

DESCRIPTION OF THE MINOR IN LEADERSHIP STUDIES

The minor in Leadership Studies is an interdisciplinary and experiential program open to baccalaureate students in all majors and degree programs. The foundation of the minor in Leadership Studies is two leadership core courses (4 credit hours), coupled with three elective courses (9 credit hours) and a field experience course (3 credit hours), for a total of 16 credit hours.

The minor in Leadership Studies seeks to promote college student leadership development by educating undergraduate students for and about leadership in a complex world. The goal of the minor is to prepare students to serve effectively in formal and informal leadership roles in campus, local, national, and global contexts. Faculty, staff, and students in the minor are dedicated to advancing the field of leadership studies by building upon and critically evaluating existing theoretical, research-based, and practical knowledge.

Core courses in the minor are sequenced to meet increasingly complex sets of learning outcomes across cognitive, personal development, group/organizational domains, and global dimensions. Students in the minor are exposed to diverse theories and perspectives on leadership and are encouraged to apply analytical skills to develop their own working philosophy of leadership that will serve them in organizational and career contexts. Civic engagement and multicultural competence are viewed as necessary requirements for leadership.

Academic Requirements

Required Courses (4 hours):

HON 3330	Leadership Theory and Practice	3 hours
HON 4130	Honors ePortfolio	1 hour

Elective Courses (12 hours):

To be selected from approved list (in development)	9 hours
Field Experience (Internship, Service Learning, Travel Abroad, or Thesis)	3 hours
Total Program Requirements	16 hours

Contact Information:

Brenda Rhoden, Director: bjrhoden@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. The Texas Medical Center is the largest in the world and 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 who 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 this program please contact Helen Valier, Coordinator of The Medicine & Society Program. Inquiries are also welcome from organizations and groups wishing to collaborate with Medicine & Society members. For more information, please visit uh.edu/honors/honors-minors-programs/medicine-society-program/.

Contact Information:

Helen Valier, Coordinator: hkvalier@uh.edu

Shasta Jones, Advisor: sfjones2@central.uh.edu

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, Locke, 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. American theorists 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, family, religion, commerce, reason, 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 the *Phronesis* Program Politics and Ethics established by the Honors College in collaboration with the College of Liberal Arts and Social Sciences. *Phronesis* is the Greek word for prudence or practical wisdom, the quality that marks 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," "Political Philosophy," "History of Ancient Philosophy," "Open and Closed Societies," "Recent Islamic Political Thought," and "The Philosophy of Punishment." The *Phronesis* program also hosts public events, such as a panel and debate over the French law that bans the wearing of niqābs and burqas, and a public lecture series that engage the wider University and community. Speakers from our lecture series in the last two years include Charles Murray, Anne Applebaum, Thomas Pogge, John Tomasi, and Paul Bloom. A select group of "*Phronesis* Fellows" have the opportunity to meet with the visiting speakers in private seminars about their work.

Contact Information:

Tamler Sommers, Director: tssommers@uh.edu

Sahar Sadoughi and Katie Teeters, Student Assistants: phronesis.politicsandethics@gmail.com

Terry Hallmark, Advisor: thallmark@uh.edu

SURF 2013 Students in Action

Join us on Facebook

Receive information regarding:

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- Scholarships for research, undergraduate, and graduate studies
- Internships
- Meetings and events for office's student organization, HURN
- Events on and off campus

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Save the Date!

PURS Spring 2014 Application Deadline:
November 15, 2013

SURF 2014 Application Deadline:
March 21, 2014

Faculty Mentoring Awards Nomination Deadline:
February 3, 2014

PURS Fall 2014 Application Deadline:
April 16, 2014

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