



Abstracts of the Emerging Scholars Program Research Projects

Spring 2009

Supported by CUNY Compact funds

Student Researcher	Mentor	Dept	Title
Carlos Quinones	Ilya Azaroff	ARCH	Emergent Interior
Florjan Pjetergjokaj	Greg Marinic	ARCH	Emergent Environment: A Collaborative Design-Build
Ermir Pjetergiokaj	Greg Marinic	ARCH	Urban Emergence: Memory, Materiality, & Manipulation in Interior Architecture
Marek Szczepkowski	Ilya Azaroff	ARCH	Emergence in an Internalized Built Environment
Julian Inoa	Anne Leonhardt	ARCH	Predicting the Acoustics (Sounds) of a 3-D Model Throughout CATT-Acoustic
Silvia Portilla	Mary Jo Schlachter	ARCH	Emergent Interior
Tomasz Bartosiewicz	J.R. Lemuel Morrison/ Shelley Smith	ARCH	High-Precision Monitoring in 3D of an 18th Century Timber Frame House
Aeisha Elchaum	Isaac Barjis	BIO	Analysis and Simulation Modeling of Glycolytic Pathway Using Petri Net
Cesor Mendoza	Walied Samarrai	BIO	Transcription Induces a Mutagenic Response during Amino Acid Starvation in <i>Bacillus subtilis</i>
Marie Dieubon	Walied Samarrai	BIO	Transcription Induces a Mutagenic Response during Amino Acid Starvation in <i>Bacillus subtilis</i>
Miriam Rubin	Niloufar Haque	BIO	Learning, Memory and Behavioral Patterns: An Experimental Study
Iman Farraj	Niloufar Haque	BIO	Learning, Memory and Behavioral Patterns: An Experimental Study
Rajvinder Kaur	Niloufar Haque	BIO	Learning, Memory and Behavioral Patterns: An Experimental Study
Alexey Shkavrov	Zongmin Li	BIO	Identification and Characterization of Protein Components in Aggregates Associated with Neurodegenerative Disorders
Vincent Palmieri	Sanjoy Chakraborty	BIO	Endocrine Disrupting Chemicals and Puberty.
Marie-Alice Rochebrun	Laina Karthikeyan	BIO	Glutamate and Parkinsons Disease
Stephanie Hoyos	Liana Tsenova	BIO	Filament Anchoring Techniques of Toothbrushes and Bacterial Retention
Isabel Barreiro	Liana Tsenova	BIO	Filament Anchoring Techniques of Toothbrushes and Bacterial Retention
Jacqueline Leach	Liana Tsenova	BIO	Comparative Study on Nosocomial Infections in New York City



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Student Researcher	Mentor	Dept	Title
Meleny Perez	Reneta Lansiquot	ENG	A Student's Guide to Virtual Worlds
Anjelin Martinez	Reneta Lansiquot	ENG	Interactive Iconography: Scaffolding Writing Across Cultures
Kenny Ventura	Matthew Gold	ENG	The Future of the Book
Gloria Buabeng	Lubie Alatraste	ENG	City Tech CUNY ACT ESL Writers
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David Morales	Delaram Kahrobaei	Math	P Versus NP
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Mursheda Ahmed	Janet Liou Mark	Math	The Effect of Pre-Learning Trigonometry.
Lori Younge	Janet Liou Mark	Math	Attitudes toward learning Precalculus in a Peer Assisted Learning Environment.
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Sherma Ann Sooden	Eric Rodriguez	SS	The Fluidity of our Identity.
Jamal Stovall	Eric Rodriguez	SS	The Other Side of Empowerment: The Potential of the Psychological Theory of Empowerment to Reduce Anti-Gay Bias
Ivelina Vodenicharova	Daniel Capruso/Kara Pasner	SS	Evaluation for Anomalous Stereoacuity in Visual Perception Students
Nu-Senbi Imhotep	Lisa Pope Fischer	SS	Examination of Health and Aging in Different Societies, Focusing on Life Expectancy in Traditionalist, or Pastoral Societies.



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Student Researcher	Mentor	Dept	Title
Peer Assisted Leaders			
Iman Farraj	Niloufar Haque/Janet Liou-Mark/AE Dreyfuss	BIO	Why Does the Expectation of Spoon Feeding Material Prevent Students from Participating in Becoming Engaged with Learning?
Miriam Rubin	Niloufar Haque/Janet Liou-Mark/AE Dreyfuss	BIO	How Can a Peer Leader Support Non-Dominant Learning Styles for Introductory Biology Students?
Rajvinder Kaur	Niloufar Haque/Janet Liou-Mark/AE Dreyfuss	BIO	How Can the Peer Leader Help Students Retain Information in Introduction Biology?
Travis Pooran	Aaron Barlow/AE Dreyfuss	ENG	How Can the Peer Leader Help Students Pass the ACT?
Jamal Stovall	Lufeng Leng/Janet Liou-Mark/AE Dreyfuss	Phys	How can Peer Leaders Help Students Self-Regulate their Learning?
Adam Atia	Lufeng Leng/Janet Liou-Mark/AE Dreyfuss	Phys	How Does Dualistic Behavior Affect the Learning Process of Students in Peer-Led Workshops?

Title: Emergent Interior
Student Researcher: Carlos Quinones
Faculty Mentor: Prof. Ilya Azaroff

The goal of this endeavor is to learn how emergent design in interior architecture may be exploited. To understand this philosophy we needed to look closely into systems, how they work, what they do, and how individuals interact with each other. The key to understanding emergence is to analyze the system within multiple scales, such as the global, local, and microscopic. We started working at small tasks that allowed us to understand an object considering fabric, usage, how it was made, and how it may be transformed. In order for us to work as an emerging system, we worked like the agents--each of us developed the assignments, then we grouped - we discussed ideas, learned from each other, returned to cross-pollinate, and then combined those groups in larger groups. With this emerging program we are discovering that the collective work will lead us to a new point, but the discovery is a diversity of paths used toward a common purpose. As dependent and connected individuals we worked in different directions but moved towards the same end.

Title: Emergent Environment: A Collaborative Design-Build
Student Researcher: Florjan Pjetergjokaj
Faculty Mentor: Prof. Gregory Marinic

In this emergent environment we are designing a collaborative design-build project based on researching, investigating, identifying, exploiting, and testing materials. The effort is a collaborative, intellectually-focused group that is being challenged through use of emergent form/performance generators toward designing a gallery installation. We began by studying the relationship of structure and skin by using the oxford shirt and testing its behavior. We tested the oxford shirt by implementing forces on it that allowed new opportunities for material connectivity to emerge. We then photographed the East Williamsburg neighborhood to identify patterns that offer a connection between the neighborhood and the design. The final design is in-process. We are currently engaged in determining the ultimate selection of generators that will reveal a site-specific narrative to be built.

Title: Urban Emergence: Memory, Materiality, & Manipulation in Interior Architecture
Student Researcher: Ermir Pjetergjokaj
Faculty Mentor: Prof. Gregory Marinic

Considering architecture from an unconventional perspective based on intensive urban research while analyzing strategies in emergent design has helped me to understand and develop my critical thinking skills as a future architect. An emergent design process is based on contextual data collection and how it informs behavioral, transformative, and growth opportunities. The initial study of the structure and materiality of an oxford shirt revealed how skin and structure are connected and how these elements work together toward formal/performative transformation of its appearance and use. Sketching and analyzing conceptual approaches, creating rule sets, and

defining a methodology allowed potentialities of the oxford shirt to emerge. This research has informed the emergence of an interior architecture based on material, color, light, and texture studies keyed into a site-specific context. Later in this process we investigated the site's one-mile radius zone in East Williamsburg, Brooklyn in search of material and pattern sources for design inspiration. Field trips offered opportunities for data collection of media and a forum to identify reusable/repurposable found objects for the ultimate built environment for d3 gallery.

Title: Emergence in an Internalized Built Environment

Student Researcher: Marek Szczepkowski

Faculty Mentor: Prof. Illya Azaroff

Our 'Emergent Environment' development process involved research and experimentation with materials toward understanding generative opportunities and performative qualities. These materials were to act as the bonding, or connective, conditions as well as the massing, or skin, of the final interior structure conceived for the d3 gallery exhibition. Our collaborative study began with many groups that executed a wide variety of experiments from diverse points of departure. As the weeks progressed, we merged into larger groups to focus on more specific aspects of design, construction, and materials selection. The direction that we followed was determined by ideas that surfaced from a pool of collective efforts, more specifically, an unconventional mining of the urban context to consider pattern and material opportunities. When the project intent was unveiled, we had already collected a dense body of experimental models and research that has provided a palette from which to establish a pointed design trajectory.

Our present collaboration involves designing an interior environment for the exhibit space at d3 gallery. The collaborative design-build effort, which will be undertaken through Emerging Scholars, Honors Scholars, other collaborators from within the Dept. of Architectural Technology, and professors Illya Azaroff, Gregory Marinic, and Mary-Jo Schlachter will begin construction in mid-May. The final installation will be open to the public as an educational device promoting emergent and sustainable design as a closed-loop environmental system.

Title: Predicting the Acoustics (Sounds) of a 3-D Model Throughout CATT-Acoustic

Student Researcher: Julian Inoa

Faculty Mentor: Prof. Anne Leonhardt

The aim of this project is to calculate and analyze the acoustical quality (sound performance) of a theater design using CATT- Acoustic. CATT-Acoustic is computer software where geometrical acoustics and octave-band echograms can be estimated based on a 3D model of a space relative to the material properties (absorption, diffusion, semi-transparency) that are assigned to the 3D model surfaces. The results will depend on the material assigned to a 3D space. The information obtained from CATT-Acoustic can be applied to real life projects. The benefit of this method is that it can predict how a space will perform acoustically before it's built, thereby allowing for improved design. We initiated our experiment by building a 3D theater in AutoCAD. Once the 3D model was built, we had to make sure the model contained the appropriate level of

architectural detail to avoid errors during the process. Once done, we imported the cad model into CATT-Acoustic, and are going through the process of setting up the acoustical parameters, such as reverberation time and material absorption. At the end we will arrive at a prediction of the sound of the theater in the 3D model.

Title: Emergent Interior

Student Researcher: Silvia Portilla

Faculty Mentor: Prof. Mary-Jo Schlachter

The goal of this endeavor is to learn how emergent design in interior architecture may be exploited. To understand this philosophy we needed to look close into systems, how they work, what they do, and how individuals interact with each other. The key to understanding emergence is to analyze the system within multiple scales, such as the global, local, and microscopic. We started working in small tasks that allowed us to understand an object considering fabric, usage, how it was made, and how it may be transformed. In order for us to work as an emerging system, we worked like the agents--each of us developed the assignments, then we grouped we discussed ideas learned from each other, returned to cross-pollinate, and then combined those groups in larger groups. With this emerging program we are discovering that the collective work will lead as to a new point, but the discovery is a diversity of paths used toward a common purpose. As dependent and connected individuals we worked in different directions but moved towards the same end.

Title: High-Precision Monitoring in 3-D of an 18th Century Timber Frame House

Student Researcher: Tomasz Bartosiewicz

Faculty Mentors: Profs. J. R. Lemuel Morrison and Shelley E. Smith.

The Timothy Knapp House located in Rye, upstate New York was an interesting as well as an exciting project since the very beginning. The 18th century wood frame house was settling over the time due to unknown circumstances. The previous groups of Emerging Scholars were unable to detect the cause of the situation; therefore a surveying crew was assigned to try to solve the problem. I, together with Min Song went there under the supervision of Prof. Morrison. After inspecting the house we set up a base control which consisted of running a level loop, a traverse lap, and GPS observations for geo referencing. For external monitoring we took chimney shots. Then we went into the basement and identified possible locations of movement and likely stable points for reference. The internal monitoring consists of taking 3-wire high precision measurements on five points all around the basement. By doing this we were hoping to find where the most movement takes place and what is causing the settling. The project will probably continue for months or even years since the settling process is very slow and repeated measurements need to be taken.

The Emerging scholars program allowed us to get the hands on experience that every engineer needs. It allowed us to see how the field work is carried out and how much time and effort it

takes to edit the data gathered in the field. From this project we also learned how it is to work together as a group.

Title: Analysis and Simulation Modeling of Glycolitic Pathway Using Petri Net

Student Researcher: Aeisha Elchaum

Faculty Mentor: Prof. Isaac Barjis.

Most publications on modeling present only the final product without describing the details as to how they were developed and tested. It is, however, by model development and testing that the true power of modeling as a research tool reveals itself. The purpose of this project is to present discrete-event simulation modeling for a biological process “carbohydrate metabolism” in general and “Glycolysis” in particular. Discrete event simulation is a great way to study and analyze complex biological processes. These simulations essentially let researchers to see events before they happen. The modeling method addressed in this project is applicable when the state variable changes only at a discrete set of points in time like glycolitic pathways. In the simulation model, inputs represent the parameters of the process and the logic describes how different objects interact and operate in the system. In addition, the pathway is a time-ordered collection of data representing what happened to the process in one instance. As a result, discrete-time event modeling is suitable and efficient for glycolitic pathway, where all inputs, rules which govern the system and new products are linked and time-ordered.

Title: Transcription Induces a Mutagenic Response during Amino Acid Starvation in *Bacillus subtilis*

Student Researchers: Cesar Mendoza and Marie Dieubon

Faculty Mentor: Prof. Walied Samarraï

In this study we examine the relationships between nutritional stress, transcription and “adaptive” or stationary-phase mutation. The process of transcription increases the concentration of single-stranded DNA that is potentially vulnerable to mutagenesis in prokaryotic and eukaryotic systems. Similarly, during the development of competency in *Bacillus subtilis*, a starvation-induced process in the stationary phase, single-stranded and gapped DNA was reported to accumulate and the enhancement of mutation frequency was demonstrated. In bacteria, an increase in reversion rates of auxotrophs was correlated with an increase in the stringent factor, (p)ppGpp, which accumulates in the absence of the required amino acid or in the presence of agents like serine hydroxamate known to induce the stringent response. An affect of transcription on mutation has been predicted and discussed as a possible mechanism for generating specific variation during evolution. The hypothesis that enhanced mutation rates result from derepression provoked by amino acid starvation and (p)ppGpp accumulation in *B. subtilis* strains with differing *relA* backgrounds was tested.

To investigate the relationship between operon derepression and mutation rates, three isogenic strains of *B. subtilis* BD79 (*leuB1, pheA1*), BD170 (*thrA5, trpC2*) and BDR79 (*leuB1, thrA5*) differing only in their *relA* background were examined. The reversion rates in the $\Delta relA$ and

the *relA* wild type strains was compared with their phenotypic requirement for at least four additional amino acids, their sensitivity to the histidine analog amino triazole and their inability to accumulate (p)ppGpp, in both drug-resistant and sensitive markers.

A positive correlation between the elevation of reversion rates in the *leuB* or *thrA* genes, (p)ppGpp levels, and the abundance of *leu*- or *thr*-mRNA after amino acid starvation or treatments with serine hydroxamate was found. Moreover, the levels of mRNA in response to nutritional stress were correlated to the variable stability of the transcript which, in turn, reflected the specific *relA* background, namely short half-lives in the *relA*⁺ or the over-producer compared to longer half-lives in the Δ *relA* strains.

Title: Learning, Memory and Behavioral Patterns: an Experimental Study

Student Researcher: Miriam Rubin

Faculty Mentor: Prof. Niloufar Haque

The success of a college student in introductory science classes is dependent upon effective learning of new concepts and material. The learning process can be best understood through three main stages (1) the receiving of new information (2) the integrating the new information into one's own understanding, and (3) the applying the new information in some application. Most General Biology I students at New York City College of Technology spend class time in the 1st and 3rd stages of learning, where students receive new information, and are expected to apply the information in an exam format. Many students struggle with the 2nd step of learning, the integration of the new material into one's own understanding. This past spring semester, three students who have successfully completed the BIO1101 course, have become team leaders in the peer-assisted-learning pilot workshops in biology, which are designed to help students integrate the material that they have received in lecture and lab. Workshop leaders are students who successfully completed the course, and thus are engaged in 3rd stage of learning, through applying their recent acquisition of information and facilitating a workshop aimed at helping their peers in the 2nd stage of learning, the integration of new information. The current research studies the components of effective learning demonstrated by the BIO1101 students and the peer leaders alike. The research highlights certain challenges in science education that prevent a student from effectively learning the material expected. Learning process in science education how and why learning happens, and some successes and challenges met in the Peer-Led workshops, will be highlighted.

Title: Learning, Memory and Behavioral Patterns: an Experimental Study

Student Researcher: Iman Farraj

Faculty Mentor: Prof. Niloufar Haque

Learning, memory and behavioral patterns are information processes that can be similarly characterized as attention, retrieval and rehearsal. Attention is most important in that it describes one's interest. Developing interest and attention leads to effort. Without this valuable prerequisite, one may not be able to apply skills to the given problem or task. An individual

must foster an attempt to pay attention in order to learn what they need to know about a topic. This is significant because it would assist one to be creative.

Learning is viewed as the acquisition of new information or skills. It involves a permanent change in mental representation or associations resulting from an experience. On the contrary, memory is related to the ability to recall information that has been previously learned. For knowledge to be absolutely understood and retained, it must be tied to something previously learned. One's previous knowledge and experiences reinforce one another and can be linked to enhance the learning process. Behavioral patterns portray patterns that refer to a change in behavior, which is an external change that one may observe. In addition behavioral patterns focus on a change in mental representations or associations. This is an internal change that one cannot see. Details of learning patterns, formation of an association with recall and its ultimate role in behavioral patterns will be discussed at the conference.

Title: Learning, Memory and Behavioral Patterns: an Experimental Study

Student Researcher: Rajvinder Kaur

Faculty Mentor: Prof. Niloufar Haque

Learning, memory and behavioral patterns are three main aspects of the Peer- Led Team Learning (PLTL) Workshop. First stage is learning in which you receive new information. Second stage is memory where you store new information in your own methods. Final stage is behavioral where you apply new information in some application. The second stage in which you store information in your own methods is difficult for the students because they do not know how to memorize data. Moreover, we tried to reduce the students' nervousness by explaining to them how to save time for work, writing notes in a calm way. In addition, we distributed worksheets that would boost the students' confidence to succeed in their courses. Therefore, students should put less stress upon themselves so that they can study effectively for an exam. Details of the results will be presented and discussed.

Title: Identification and Characterization of Protein Components in Aggregates Associated with Neurodegenerative Disorders

Student Researcher: Alexey Shkavrov

Faculty Mentor: Prof. Zongmin Li

One common pathological finding of various neurodegenerative disorders, such as Parkinson's disease (PD), Alzheimer's disease (AD) and amyotrophic lateral sclerosis (ALS), is the accumulation of ubiquitinated proteins in inclusions, although it occurs in selective neurons in each disease. The mechanisms generating such abnormal aggregates and their role in neurodegeneration remain unclear. Recent studies have shown that inflammation may play an important role in the aggregation of ubiquitinated proteins and subsequent neuronal cell death associated with various neurodegenerative disorders. Our previous studies with human SK-N-SH neuroblastoma cells demonstrated that PGJ2 causes the accumulation and aggregation of polyubiquitinated proteins and the aggregates also contain sequestosome. The main objective of

this study is to identify and characterize ubiquitinated proteins that accumulate and aggregate in PGJ2-treated human SK-N-SH neuroblastoma cells using a proteomic approach. Polyubiquitinated proteins accumulating in SK-N-SH cells upon PGJ2 treatment were affinity-purified with a matrix coupled to a UBA-peptide with the same sequence as the UBA domain of sequestosomes and identified by two-dimensional gel electrophoresis and mass spectrometry. Identification and characterization of polyubiquitinated proteins that accumulate in neurons under stress conditions will provide insights into neuronal inclusion biogenesis and underscores the potential for the discovery of new molecular markers for early diagnosis of neurodegenerative disorders.

Title: Endocrine Disrupting Chemicals and Puberty.

Student Researcher: Vincent Palmieri

Faculty Mentor: Prof. Sanjoy Chakraborty

The endocrine system is a complex communication network made up of specialized cells, glands and hormones. The glands release hormones into the blood or the fluid surrounding cells in response to stimuli from inside and outside the body. Our understanding of how endocrine disrupting chemicals (EDCs) interfere with hormones and other chemical signalers is growing rapidly. Once thought to primarily interfere with hormone receptors, we now know the culprits also impact a wide range of signaling processes. They can interfere with hormone binding, transport, and production; gene expression; and a host of other cell regulatory mechanisms. EDCs have been found in various plastic products to flame retardants, pesticides and products that we use daily. In this project, we studied some specific EDCs and their profound effect in the developmental stages of gonads, and sexual characteristics. Androgen, a steroid hormone, confers masculinity by triggering and controlling body programs that govern male sexual development and physique. In females, androgens play more subtle roles. In humans and other vertebrates, androgens are made primarily in the male testes, female ovaries, and adrenal glands. Androgens control male sex traits and development. Later in life, the hormones trigger male puberty, influencing vocals, body ornamentation, muscle mass, and behaviors such as sex drive and aggressiveness. A group of industrial chemicals known as phthalates can reduce testosterone production in fetal testes causing sex-organ defects and loss of reproductive functions in animals. Phthalates are associated with several subtle, yet potentially serious, genital changes in baby boys whose mothers, when pregnant, had elevated levels of the chemicals in their urine. The boys' shortened anus to penis distance, incomplete testes descent, and smaller scrotum and penis may forewarn of infertility or cancer later in life. Estrogen mimics, blockers, or other interlopers are the best known and studied of all endocrine disrupters. While no clear links are yet evident, some studies showed that increasing exposure to estrogen-like chemical mixtures in everyday life contributes to rising rates of testicular and breast cancers, increasing numbers of sex organ deformities, declining sperm counts, and precocious puberty in industrialized countries. In conclusion, the studies reviewed offer us an understanding of how we on a small chemical level are influenced in our bodies by these EDC's. Alarmingly, over 80% of the population contains traces of EDC's in their bodies. Taking into account, such imposter hormones have disrupted hormone levels and in turn, disrupt us humans developmental at all stages of life.

Title: Glutamate and Parkinson's Disease
Student Researcher: Marie-Alice Rochebrun
Faculty Mentor: Prof. Laina Karthikeyan

Parkinson's disease (PD) is associated with degeneration of the pigmented dopaminergic neurons located in the ventral mesencephalon. Although the mechanisms by which these neurons degenerate in PD are poorly understood, there is evidence showing involvement of glutamatergic mechanisms in the pathogenesis of this disorder. Glutamate, the major excitatory transmitter in the mammalian central nervous system, is known to be neurotoxic when present in excess at the synapses. Two major mechanisms protect neurons from glutamate-induced toxicity: (a) removal of synaptic glutamate via a high affinity uptake carried out by cytoplasmic membrane proteins known as excitatory amino acid transporters (EAAT); and (b) metabolism and recycling of glutamate by synaptic astrocytes via glutamine synthetase, an ATP-requiring reaction. This project will address if inhibition of glutamate dehydrogenase will lead to a selective loss of dopamine neurons.

Title: Filament Anchoring Techniques of Toothbrushes and Bacterial Retention
Student Researchers: Stephanie Hoyos, Isabel Barreiro, Esma Almontase
Faculty Mentor: Prof. Liana Tsenova

Recent studies have shown that although the different designs applied to the filament arrangement of the bristles of the toothbrushes show an improvement in plaque removal, it may also increase bacterial retention and growth. In fact, this event may create more damage instead of benefit in our regular oral hygiene because it may become a possible source for oral recontamination. The new designs of toothbrushes may harbor more microorganisms due to the fact that drying, as well as rinsing requires more time in order to efficiently reduce bacterial adherence. We hypothesized that filaments that are placed into bundles would have a higher chance to harbor microorganisms since they would require more rinsing/drying time than other types of toothbrushes.

In our study we examined and compared three types of filament anchoring techniques (staple-set tufting, in-mold tufting, and individual in-mold tufting). We tested the adherence of two common microorganisms such as *Streptococcus mutans* and *Candida albicans*. The results will be presented and discussed. This study will bring some insights into the effect of different filament anchoring techniques on the bacterial levels on toothbrushes.

Title: Comparative Study on Nosocomial Infections in New York City
Student Researcher: Jacqueline Leach
Faculty Mentor: Prof. Liana Tsenova

Nosocomial infections (NI) are infections that are usually contracted at a hospital, nursing home or health care/patient care units. These infections are spread from unclean and non-sterile environmental surfaces or from health care providers not practicing aseptic techniques when

caring for patients. A few common nosocomial infections are 1) hospital acquired pneumonia (HAP), which is spread by poor indoor air quality and can be prevented by controlling and monitoring the indoor air; 2) *Clostridium difficile*, an endospore forming anaerobic gram positive bacterium that grows in the gastrointestinal track; 3) Methicillin resistant *Staphylococcus aureus* (MRSA), spread when aseptic techniques are not followed when caring for patients with open wounds, weakened immune systems and invasive devices.

We did a comparative epidemiologic study based on the literature on the spread of NI in New York City. We defined the most common bacterial species that cause these infections and the risk factors for them. We also define some measures for prevention and control of NI in order to contribute to the limitations of such hazards.

Title: A Student's Guide to Virtual Worlds

Student Researcher: Meleny Perez

Faculty Mentor: Prof. Reneta D. Lansiquot

Last semester, I was given the chance to work on a project on how virtual worlds could facilitate meaningful communication. I investigated the creation of manuals written for students by student groups and interviewed students from three sections of Prof. Lansiquot's Advanced Technical Writing course, asking general questions about their use of Second Life—a 3D virtual world created by its residents—and what they have learned so far.

This semester, I used the knowledge that I gained last semester to help the students with their projects. I also modified my interview questions because students were not able to answer some questions early on during their group project, so I asked more follow-up questions. Further, I learned that I have to interview each group member separately to gain a real sense of what is really happening in the group. While working with students last semester, I learned a great deal and was able to make a few observations. The first observation was that students did not choose their group members wisely; they simply chose classmates sitting next to them. This selection process may have occurred because some students were shy or because of the failure of other students to get up off their chairs, even when prompted, and pitch their ideas to others or join a group with a topic of interest to them. Student groups this semester talked to each other and grouped together based on their interests. I believe this change occurred this semester because students are more engaged in the project, probably because they had more time to explore Second Life.

Another observation I made is that the students this semester became familiar with the virtual world faster than the students from last semester. The students this semester had student manuals—the models created by student groups last semester—to help them choose their topics, and they were introduced to Second Life earlier than the students were last semester. Prof. Lansiquot quoted me in her recent article “Advance Technical Writing: Blending Virtual Communities” in the *Journal of the Research Center for Educational Technology*, stating, “To improve this course I would probably introduce Second Life a little earlier and give the class a bit more time to explore, and give them ideas about a theme that someone created in a previous

class.” I believe that, because this suggestion was followed, there was a major improvement this semester over the last semester.

I learned many things from the five sections of this course, both this semester and last. Results from last semester indicated that, overall, students’ tendencies to avoid writing situations were significantly lowered. I will attend the ED-MEDIA 2009 World Conference on Educational Multimedia, Hypermedia & Telecommunications in Honolulu, Hawaii, this summer to present “A Student’s Guide to Virtual Worlds” with Prof. Lansiquot in order to highlight this and other findings from these two semesters.

Title: Interactive Iconography: Scaffolding Writing Across Cultures

Student Researcher: Anjelin Martinez

Faculty Mentor: Prof. Reneta D. Lansiquot

The purpose of this research study is to analyze how reading interactive iconography will affect critical writing skills. As a student in “English Composition I: Writing Across Cultures,” I was given the chance to explore *Scope Out* (www.scopeout.info), an interactive iconography application designed by Prof. Lansiquot to allow students to layer selected sections of a narrative, save the results, and review multiple revisions of museum labels written for ancient artifacts. Using this online revision tool, student groups examine iconography (from ancient Egypt, Peru, and Rome) and write museum labels. Chosen iconographies are open to interpretation because even experts do not agree on their true meaning. Although this study is still ongoing, as a research assistant, I have reviewed and made suggestions for improving Prof. Lansiquot’s application. I discovered glitches and ways the application could be made easier for students to use. I also viewed the iconographies and wrote museum labels before my classmates used the application in groups and familiarized myself with the “help” button of this tool, which allows students, first, to brainstorm their ideas and then to write topic sentences. As a result of this experience, I am now able to respond to questions or help students solve problems during the use of this application.

In preparing to introduce students to *Scope Out*, Prof. Lansiquot and I began by planning how the student groups would be formed. Because we were aware of how students interact with each other during class, we decided to randomize the groups. We took many things into consideration and tried to anticipate what could go wrong and how to avoid it. We discussed whether a larger group of five students would be better than a smaller group of three students or whether an odd number in a group would balance opinions. Because classes are only one hour and fifteen minutes long, we had to also take into consideration how much time to allow the groups for discussing and analyzing the iconographies and how much time to give them for writing museum label paragraphs.

When students were in groups, I observed their group dynamic—their behaviors and how they interact in groups—as they discussed the possible meanings of the narratives for the iconographies on the ancient artifacts. After student groups completed their museum labels, Prof. Lansiquot and I used *Scope Out* to comment on their paragraphs. I analyzed and interpreted the museum labels by looking for patterns and determining the approach the students took to writing

these labels. After reading and analyzing the different groups' interpretation, I interviewed the students and tried to determine whose ideas were included or excluded in the submitted museum labels. I asked individual group members questions to help me discover how the group agreed on its conclusions, whether agreement was affected by individuals' cultural background or their prior knowledge. Finally, we will ask students for suggestions to improve the application for future use.

Title: The Future of the Book

Student Researcher: Kenny Ventura

Faculty Mentor: Prof. Matthew Gold

Professor Gold and I spent the semester working on issues surrounding the future of book publishing, which is an interesting topic to research today because we are getting more and more of our information from online sources rather than from printed books. We concentrated on The Institute for the Future of the Book, which is a "think and do tank" that examines these issues. This research was in preparation for an interview that Professor Gold will be conducting with the founder of the Institute, Bob Stein, which will be published next fall in the journal *Kairos: A Journal of Rhetoric, Technology, and Pedagogy*.

Bob Stein is a founder of Voyager, an early multimedia company that produced many educational CD-ROMs. He is also a co-founder of the **Criterion Collection**, a well-known company that produces DVDs and that pioneered the inclusion of DVD commentaries and other extras. Stein's recent work with the Institute for the Future of the Book includes projects such as **CommentPress** which is a Wordpress extension that allows users to read posts that people have posted and then comment on specific paragraphs. This allows for a more personal touch for certain posts than users might be familiar with. Another project is called **Sophie**, which allows users to create their own type of e-book, or Adobe-Acrobat-like document without knowing any programming. This is helpful for authors who plan on releasing their books online on their personal websites. There are many more projects from the institution that have been created and that look very promising

Because Professor Gold was interested in conducting the interview on Facebook, he asked me to research Facebook's privacy policy and terms of service. I found out that Facebook's policies are very restrictive, which makes it hard to republish information first published there. As a result, Professor Gold is reconsidering this plan, though he still wants to conduct the interview in a networked space.

As we head into the final weeks of the program, I plan on finishing the research on Robert Stein and continuing to explore the future of book publishing with Professor Gold. I am thankful for the opportunity that City Tech has provided me and I am grateful to Professor Gold for giving me a chance to work beside him.

Title: CityTech CUNY ESL ACT Writer: Their Personal Stories and Views on the ACT
Student Researcher: Gloria Buabeng
Faculty Mentor: Prof. Lubie G. Alatraste

This was a very new experience for me. I was scared because it was all new to me. In the beginning, I made a lot of mistakes coding the data, but every day I got better. Professor Alatraste was patient and she explained everything to me, so I learned how to collect data and code it. I am so grateful to work with my professor because I never thought I could do something like this. I never imagined I'd work on research with my professor.

I learned a lot in the past two months. First, Professor Alatraste and I met and we talked about the project. We discussed the questionnaires and how to distribute them to students. Then, we set up a filing system for data tracking. Every week, we got new questionnaires to code. I had to record the responses for each item on both types of questionnaires. I learned how to make spreadsheets and track each student's responses across all 40 questions. Then, we tallied the results according to the categories. I was so excited. This was new to me, but I could to it. We also double-checked the answers on questionnaires to make sure we wrote it down correctly on the spreadsheet.

Our project goal was to find out what prior knowledge ESL students had about the CUNY writing entry test – the ACT. We also wanted to know what type of writing the ESL students did in high school. Some of our results show that many students didn't know anything about the test. They didn't understand it. Many of them have only been in the country only 2 or 3 years. We also found that there were a large percentage of males and a large number of Chinese students in this study.

Title: Novel Approach to the Design of Analog Electronic Filters Suitable for Electrical Engineering Technology Students.
Student Researcher: Zaw Zaw Latt
Faculty Mentor: Prof. Djafar K. Mynbaev

The purpose of our research is to investigate the electronic filters designed for communications circuits. We are developing a new approach to the filter design, an approach that can be understood and implemented by engineering-technology students. In this project we have concentrated on the family of Chebyshev filters that belongs to the group of elliptic filters. The main goal in filter design is obtaining its desired amplitude and phase responses along with time group delay—the major characteristics of the filter—within required tolerances. This is what we have done in this phase of our research. Specifically we have found a general equation for the transfer function of a Chebyshev 1 filter, determined the poles of this filter, and by plugging the calculated poles, we obtain the transfer function, $H(\omega)$, of this filter in explicit form. To check the correctness of our operations, we compare the denominator of this function with that given in the literature as Chebyshev polynomials. Then we have obtained the amplitude response, $|H(\omega)|$ and the phase response, $\Theta(\omega)$, from $H(\omega)$. We have also derived the expression for a group delay from the formula for the phase response. Finally, we have built the graphs of

amplitude and phase responses and group delay. In this work we also investigated how the filter order and the ripple factor affect the amplitude response of this group of filters.

Working with Professor Mynbaev on this project, I've learned how to develop theory of electronic filters based on general theory of linear time-invariant systems. What's more, I've learned how to apply this theory to analysis of specific filter prototypes. This application allows me to understand the requirements and approaches to a filter's design, the knowledge and skills that every technologist in electrical and telecommunications engineering technology must have to be successful in their professional careers.

Title: P vs. NP

Student Researcher: David Morales

Faculty Mentor: Prof. Delaram Kahrobaei

The million dollar problem P vs. NP still stands as one of the most difficult problems to solve in mathematics and computer science. The research consisted of exposing the theory and importance of P vs. NP. Proving that P is equal to NP consists of creating an algorithm capable of solving an NP-complete problem in an efficient time. A problem is said to be solved efficiently or in polynomial time if the steps to solve the problem are. Class P has algorithms that solve problems in polynomial time; however NP has no efficient algorithms to solve for their problems in polynomial time. Reasons that spark interest in solving the P vs. NP problem are cryptography and the creation of faster computers. Technology advances and so does the need for faster algorithms to compute and solve problems quickly. The P vs. NP problem is important for cryptography because it could be rendered useless if a solution for the problem is found. Finding a solution to this problem can change the future as we know it.

Title: Digital Signature – Schnorr and Fiat Shamir Digital Signature Schemes

Student Researcher: Sereta Scott

Faculty Mentors: Prof. Delaram Kahrobaei

Secure and private communication is one of the necessities of social life. A few questions have been manifested from this: How can one transmit the message secretly, so that no unauthorized person gets the knowledge of the message? How can the sender ensure himself that the message arrives in the right hands exactly as it was sent? How can the receiver ensure himself that the message is coming from the right person exactly as it was transmitted? There are two ways to solve these problems. One can disguise the existence of the message, or try to transmit the message via a trustworthy person.

A more modern and scientific approach is to solve these problems is cryptography, specifically ElGamal's, Schnorr's and Fiat Shamir Digital Signature Scheme. These signatures are widely used because of the difficulty of solving Diffie-Helman key exchange, which involves the discrete log problems. Schnorr's Digital signature scheme is based in the same principle as the ElGamal's except that Schnorr's method first signs the message then it applies the hash function, and ElGamal's the other way around. In

Fiat Shamir Scheme the difficulty of solving the scheme is based on the ability to factor a modulus prime number which is similar to that of RSA signature Scheme.

In this research, we will present the Schnorr's and Fiat Shamir digital signature. We will look at the different types of schemes and methods to generate, sign and verify a digital signature. We will show how Cryptography algorithm method is used to produce digital signature. We will construct a program using Maple software to generate public keys, private keys, signing a message and verify that the signature is valid or not. In addition we will explain the goals as well as its relation to data security. We will be exploring the mathematical and computational aspect of digital signature.

Title: Bio-Surveillance and Detection of an Outbreak
Student Researchers: Gilbert Center and Ya Ping Zhang
Faculty Mentor: Prof. Urmi Ghosh-Dastidar

Bio-surveillance is the process of monitoring disease in people, animals, or plants. It systematically obtains and examines data to detect the emergence of diseases, outbreaks of diseases, and environmental conditions that influence disease transmission. In this project we explored how statistics can be used to detect the presence of salmonella or rotavirus outbreak in human populations. Rotavirus is also one of the most common viruses among children that cause severe diarrhea, results in approximately 55,000 hospitalizations each year and globally deaths of over 600,000 children per year. Once exposed, the children show symptoms on average within 2 days. Symptoms include fever, frequent abdominal pain, watery diarrhea and vomiting for 3-8 days. Salmonella infection is an intestinal infection among humans that is caused by a bacterium named salmonella. Most infected persons develop fever, diarrhea, and abdominal cramps within 12 to 72 hours of infection. Although most patients recover without treatment, in some cases, especially elderly, infants, or people with immunity problem the diarrhea could become severe: Infection may spread to blood stream and can result in death. The data we used for outbreak detection, although these are not exactly real data, we tried to obtain the data as close as real data by analyzing graphs and charts from several articles. We studied and explored moving average and exponentially moving averages for rotavirus and salmonella infection using these data sets. The alarm levels are calculated for both cases. The two different data smoothing techniques helped us to make predictions of future transmission, detect outbreaks while the daily counts exceed the estimated alarm level.

Title: The Effects of Pre-Learning Trigonometry
Student Researcher: Ms. Mursheda Ahmed
Faculty Mentor: Prof. Janet Liou-Mark

New York City College of Technology offered a free nine-hour workshop in an Introduction to Trigonometry during the 2009 winter intersession where twenty-nine students participated over a three-day period. This workshop was designed for students to learn basic trigonometric concepts prior to taking MAT 1275: Introduction to Mathematical Analysis. Topics covered include the

definition of trigonometric functions, right angle trigonometry, radian measure, trigonometric functions of special angles, and proving identities. Students who had completed the three-day workshop will be surveyed during the spring 2009 semester. Data on the effects of pre-learning trigonometry was collected and analyzed.

Title: Attitudes Toward Learning Precalculus in a Peer Assisted Learning Environment

Student Researcher: Ms. Lori Younge

Faculty Mentor: Prof. Janet Liou-Mark

The use of Peer Assisted Learning (PAL) to support the learning of Precalculus is based on the Peer-Led-Team-Learning model. Students who have done well in the course act as a guide and facilitator to groups of six to eight students. These Peer-Assisted groups meet once a week to work on carefully structured problems. This study will examine the attitudes toward learning Precalculus in a PAL workshop situation. Attitudinal data were collected from the students participating in these workshops. An analysis of the results is summarized.

Title: Lie Algebras and Lie Groups

Student Researcher: Alex Lavaud

Faculty Mentor: Prof. Andrew Douglas

The theory of Lie groups and Lie algebras is one of the most beautiful developments of pure mathematics in the twentieth century, with intimate links to geometry, algebra, mechanics, and theoretical physics. Lie groups are groups with a compatible differential structure. A Lie algebra, informally speaking, is an "infinitesimal" version of a Lie group. We will examine the theory of Lie algebras, and Lie groups, and the intimate connection between these two mathematical structures.

Title: Testing and Upgrading Physics Experiments

Student Researcher: Thinh H Le

Faculty Mentor: Prof. Lufeng Leng

Students who will take PHYS 2605 are offered very exciting experiments. In order to make sure the laboratory activities are effective and satisfying to the students, these newly designed experiments have to be tested. I will test them and provide feedbacks for the Physics Department to optimize the experiments. This is a continuing project from last semester. Some experiments have already been tested and improved. I will continue to test Erbium-doped Fiber Amplifier (EDFA) and Open-cavity He-Ne Laser. In addition, I will also test the split-beam holography setup, which is to be incorporated into the PHYS 1434 and PHYS 1442 syllabi and is an upgrade to the Holography experiment currently being in the PHYS 1112 syllabus. This will take the holography experiment to a deeper level of understanding.

Title: Ordinary Hall Effect and Quantum Hall Effect in Two-Dimensional Electron Gas (2DEG) in Quantum Wells.

Student Researcher: Dennis Nguyen

Faculty Mentor: Prof. Oleg Berman

The influence of magnetic field on the conductive properties of metals and semiconductors is analyzed. It is shown that the external magnetic field causes the non-zero off-diagonal elements of the tensor of conductivity to appear in the Drude model. These off-diagonal elements are determined by the Hall coefficient which has been calculated for different metals and semiconductors. Quantum Hall Effect with the discrete steps in the off-diagonal elements of the conductivity tensor was discovered in 1980 by von Klitzing, Dorda and Pepper. In 1985 Klaus von Klitzing was awarded the Nobel Prize for it. The off-diagonal coefficients of the conductivity tensor have been compared for the Ordinary Hall Effect (OHE) and the Quantum Hall Effect (QHE) observed in two-dimensional electron gas (2DEG) in quantum wells. The calculation of the Hall coefficient R_H of some metals was performed. The applications of QHE for the high-precision measurements of Planck's constant are analyzed and discussed as calculating the off-diagonal coefficients of the conductivity tensor.

Title: Conductive and Optical Properties of Different Metals and Semiconductors: Applications to Solar Cells.

Student Researcher: Adam Atia

Faculty Mentor: Prof. Oleg Berman

In the Drude model, electron gas in solids is described through the framework of the kinetic theory of gases. The conductive and resistive properties of various metals have been analyzed using the Drude model. In addition, the relaxation times have been obtained for different metals. By calculating resistivity and relaxation time, the capability of a conductor can be characterized. The influence of the band structure on the conductive and optical properties of metals, semiconductors, and dielectrics is studied and described. Based on the measurement of the light pumping effect on the conductivity of a semiconductor, the energy gap is calculated. The applications of semiconductors in various solar cells have been analyzed and discussed.

Title: Conductive Properties of Different Metals and Semiconductors. Role of Magnetic Field

Student Researcher: Mirna Germano

Faculty Mentor: Prof. Oleg Berman

The Drude model for the conductivity in the metals and semiconductors was studied. The electrons are assumed to be free moving particles which do not interact with any field between two collisions. The time between any two collisions for all electrons is approximated by its average value which is the relaxation time. The relaxation time for different metals and semiconductors is calculated applying the Drude model. The results of the calculations show that better conductors are characterized by lower resistivity and higher relaxation time. The influence of magnetic field on the conductive properties of metals and semiconductors is analyzed. It is

shown that the external magnetic field causes the non-zero off-diagonal elements of the tensor of conductivity to appear. These off-diagonal elements are determined by the Hall coefficient. The drift velocity for a copper stripe is calculated for the specific experiment providing the Hall emf in the external magnetic field.

Title: Social Support and Mental Health in Middle-Aged Adults: Gender Moderation

Student Researcher: Kelesha Scott

Faculty Mentor: Prof. Katherine Fiori

Research indicates that social support can have a powerful impact on mental health. Importantly, social support is a multidimensional construct that consists of the type of support (i.e., instrumental or emotional), the direction of support (i.e., given or received), the sources or targets of support (e.g., kin vs. non-kin), and whether support is actual or potential. In addition, there is evidence that social support may differentially affect men and women. The purpose of this study is to determine whether gender moderates the association between these various aspects of social support and depressive symptoms. Using a sample of 6,824 middle-aged adults from two waves of the Wisconsin Longitudinal Study (1992-3 and 2003-5), we tested the hypothesis that social support would have a greater positive effect on the mental health of women. Using a series of linear regressions predicting Time 2 depressive symptoms and controlling for a variety of background variables as well as Time 1 depressive symptoms, we found that social support decreased depressive symptoms in women more than in men. Specifically, for women who receive emotional support from non-kin, receive emotional support from kin, anticipate instrumental support from non-kin, provide emotional support to kin, or who have a friend they call a ‘confidant’ have lower depressive symptoms than women who do not; in men, the association between social support and depressive symptoms was close to zero. Overall, our study supports previous research showing that, to some extent, social support is more beneficial for women than for men.

Title: The Fluidity of our Identity.

Student Researcher: Sherma Soodeen

Faculty Mentor: Prof. Eric Rodriguez

As a continuum to my prior research on the Integration of Two Separate Identities; Single Mother and College Student (Emerging Scholar’s Project, Fall 2008) I decided to focus on two researched aspects of identity. Shallenberger’s (1996) Theory of Identity integration as it pertains to the individual’s life context and the process involved, and Deaux’s (1993; 1998) concept of Social Identity as a process of negotiation and renegotiation to adapt and change existing identities. Both of these theories center on the theoretical foundation of symbolic interactionism, formulated by Mead (1962) and further developed by Goffman (1963) and others. Symbolic Interaction stresses the fact that our identity is formed and then reshaped as per our social environment and experience in conjunction with our perception of ourselves through the eyes of others.

As I explore these concepts within my life context, I can definitely relate to the fact that my identity continues to be reshaped and adjusted based on my experience. I am the first in my family to attend college and that in itself has opened up a wellspring of questioning, reclaiming and integration as I explore my identity issues in the context of being a mother, a college student, and a woman of East Indian Decent. In this project, I discuss the intersection of these identities in my own life, and relate them back to both the concept of symbolic interactionism as presented in the works of Shallenberger and Deaux.

Title: The Other Side of Empowerment: The Potential of the Psychological Theory of Empowerment to Reduce Anti-Gay Bias

Student Researcher: Jamal Stovall

Faculty Mentor: Prof. Eric Rodriguez

The psychological theory of empowerment works on three different levels – psychological (or individual), organizational and community - and is defined as "an intentional ongoing process in the local community, involving mutual respect, critical reflection, caring, and group participation, through which people lacking an equal share of valued resources gain greater access to and control over those resources" (Zimmerman, 1996). During my time spent working with Dr. Rodriguez, I have been reading about the gay/lesbian/bisexual (GLB) community and the conflicts they experience because of their sexual orientation. I have explored articles that document the problems of identity conflict and integration in gay and lesbian people of faith, and how the theory of empowerment has been used in the field of psychology to uplift these individuals, as well as the GLB community as a whole. Throughout the spring 2009 semester I encountered anti-gay bias from my peers and classmates because of my work in this area. Confronting their negative attitudes, however, helped me greatly to put things into perspective. At an institute of higher learning like City Tech, it is my desire to share the discrimination and prejudice that I have witnessed this semester in an attempt to cause a reevaluation in our way of thinking about the GLB community, and thus to empower my peers, classmates and myself to address the ignorance and intolerance that has sadly become second nature to so many. Through a detailed review of the works of Rodriguez (in press), Zimmerman (1996), Yip (1997), and Shallenberger (1996), I explored the concept of empowerment as a process and how, as a community, we can work together to empower both ourselves and others to become more tolerant of those who are different from us.

Title: Evaluation of Stereopsis in Visual Perception Students

Student Researcher: Ivelina Vodenicharova

Faculty Mentors: Profs. Daniel Capruso and Kara Pasner

Stereopsis is the ability to see all three dimensions of space through binocular disparity. Because stereopsis is an important feature of fully developed human vision, students in NYC College of Technology's Visual Perception Course demonstrate their understanding and skill by producing stereographic images as a laboratory requirement. A difficulty with this requirement is that up to one-third of persons have anomalous stereoacuity and cannot fully experience depth through

binocular vision. To address this potential difficulty, Visual Perception students were evaluated using a Keystone Ophthalmic Telebinocular to measure far-point local stereopsis between 1300 and 1 seconds of arc. Of those tested, all had adequate binocular far-point visual acuity. When monocular testing was performed, several students were found to have low visual acuity in one eye. Of the students with adequate far-point visual acuity in each eye, all had normal stereopsis. Low visual acuity in one eye was associated with anomalous stereoacuity.

Title: Examination of Health and Aging in Different Societies, Focusing on Life Expectancy in Traditionalist, or Pastoral Societies.

Student Researcher: Nu-Senbi Imhotep

Faculty Mentor: Prof. Lisa Fischer

The belief that modern biomedical healing is superior to traditional herbal healing method -- myth or reality? This article investigates life expectancy in traditional pastoral society using “natural” herbal medicine in comparison to aging of people living industrial societies who rely on modern biomedical medicine. Increasingly more people from post industrial societies are choosing herbal medicine globally; which is a new phenomenon to members of biomedical society. If modern medicine is superior what is the cause of this trend?. “Naturopathy,” a relatively modern name for medicine used for ages by traditionalists, on the other hand have been receiving recognition in the field of modern medicine. This research will utilize a comparative approach to examine the health and aging of the Massai tribe, living pastorally in Tanzania, East Africa, and health and aging of people living in modern Western societies. This aim of this research is to dispel the myth that modern medicine is superior to herbal medicine; herbal medicine is not only equally effective as modern medicine, but also sustainable and eco-friendly, and may even be healthier to the extent that herbs grow “organic,” without fertilizers.

Title: Why Does the Expectation of Spoon Feeding Material Prevent Students from Participating in Becoming Engaged with Learning?

Student Researcher: Iman Farraj

Faculty Mentors: A.E. Dreyfuss and Profs. Janet Liou-Mark and Niloufar Haque

The expectation of spoon-feeding material retards the ability to think independently and creatively. Parroting the text and memorizing without developing a concrete understanding of the material is harmful to students’ education. As a Peer Leader, it is imperative to help the students establish the bridge between knowledge previously learned and with the newly presented information (Vygotsky, 1987). Here, this can be successfully carried out through workshop modules. With the assistance of a Peer Leader, this can be accomplished by creating spaced-out practice and review workshops. This will help the students remember and internalize newly presented information.

Title: How Can a Peer Leader Support Non-Dominant Learning Styles for Introductory Biology Students?

Student Researcher: Miriam Rubin

Faculty Mentors: A.E. Dreyfuss and Profs. Janet Liou-Mark and Niloufar Haque

It is commonly understood that college students have many different learning styles and achieve understanding at different rates. Students whose learning style is compatible with the course instructor's tend to retain information longer, and be more successful in the course. Instructors tend to teach the way that they were taught, and most Introductory Science courses favor students who have learning styles that are intuitive, verbal, deductive, reflective and sequential, according to Felder and Silverman's Dimensions of Learning Scale. Many students who do not learn in those ways because they have learning styles that are more sensory, visual, inductive, active and global, tend to struggle in Introductory Biology courses, in part due to the failure of the class structure to address a wider diversity of learning styles. The Peer Leader workshops have been useful to serve the students with learning styles that are not addressed in the classroom.

Title: How Can the Peer Leader Help Students Retain Information in Introduction Biology?

Student Researcher: Rajvinder Kaur

Faculty Mentors: A.E. Dreyfuss and Profs. Janet Liou-Mark and Niloufar Haque

During my workshop, I worked on three main processes of information: *encoding, storage, and retrieval*. The first process, *Encoding*, is receiving, processing, and combining of received information into a form that can be stored in memory. The second process, *Storage*, is creation of a permanent record of the encoded information in memory. The final process, *retrieval or recall*, occurs when information is brought to mind. To improve your memory you must perform all three processes-encode the information, store it, and then get retrieval of information. Also, in my workshops I observed in students that if I showed pictures or diagrams to the students, they learned faster and remembered the information for a longer period. Music, especially classical, enhances the storage and recall of memory. The visual and auditory information are the components of *The Working Memory Model* (Baddeley 1974). Overall, sound and visuals help to keep information in long term memory. Moreover, in our workshop we tried to reduce the students' nervousness by explaining to them how to save time for work, writing notes to memorize their work, and we told them to study their notes in a calm way.

Title: How Can the Peer Leader Help Students Pass the ACT?

Student Researcher: Travis Pooran

Faculty Mentors: A.E. Dreyfuss and Prof. Aaron Barlow

In an experimental workshop, the Peer Leader and mentors developed lesson plans to help students who had previously not passed the American College Test (ACT). This workshop was put in effect to see if a "more capable peer"(Vygotsky) would help. Using Vygotsky's theory of

the Zone of Proximal Development, the Peer Leader provided scaffolding to the students through various techniques, including brainstorming, creating T-bars and webs, and discussing test-taking skills. The workshops met twice a week and went over various ways of tackling the American College Writing exam. The skills students learn in this workshop are expected to reduce stress and possibly cause them to get a better score. The results will be known after the students take the ACT test in May.

Title: How Can Peer Leaders Help Students to Self-Regulate their Learning?

Student Researcher: Jamal Stovall

Faculty Mentor: A.E. Dreyfuss and Prof. Janet Liou-Mark and Lufeng Leng

Title: How Does Dualistic Behavior Affect the Learning Process of Students in Peer-Led Workshops?

Student Researcher: Adam Atia

Faculty Mentor: A.E. Dreyfuss and Profs. Janet Liou-Mark and Lufeng Leng

Throughout the semester, Peer-Led workshops have been carried out in conjunction with certain classes. The purpose of these workshops is to promote active learning, collaborative learning amongst students, and to supplement the courses by enhancing students' understanding of the content being studied. I have led a group of Calculus students and have observed different behaviors that could either dim or illuminate one's learning process. The focus of this project will be on dualism (Perry) and how it stunts the growth of a student's potential, based in part on observations made during Peer-Led Workshops.