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ABSTRACTS

Student: Jonathan Abraham Adames

Mentor: Prof. Marcos S. Pinto

Title: Android Application – "New York City Daycare Locator"

The "New York City Daycare Locator" is a mobile Android Application that allows a user to search for day care facilities according to the user's choice of Zip Code (limited to Bronx, Manhattan, Queens, and Brooklyn). The application helps parents find a daycare location closest to them. To make the application function to allow this kind of search, I had the application work with google maps to search for daycare facilities surrounding the chosen Zip Code by the user. With this, I found that the Google Maps Database of daycare locations also includes some public schools and pet care facilities. With this, more work should be done in creating a database of just daycare facilities and implicating it on the application's own google maps fragment instead of the Google Maps application's database of daycare facilities.

Student: Banny Chen

Mentor: Prof. David Lee

Title: Motivational Technologies for Fitness

An emerging and under-explored area of contemporary communication is mobile smartphone health apps. Health apps have been used by a large portion of the population, but many of those users have also stopped using the apps due to varying reasons (Krebs 2016). In addition, health apps, such as MyFitnessPal, which helps in tracking calorie intake, may not be effective in weight-loss (Laing 2014). How can health apps better motivate users to stick with it and realize their health goals? The findings of this study suggest three approaches for further research; focusing on the type of health goal (ie. physical, mental, spiritual); the persuasive techniques employed (ie. habit-forming, behavior change, motivation); or user features (ie. platform usability; multimedia/social network functionality; etc).

Student: Melissa Fontus

Mentor: Ralph Alcendor

Title: Effect of Ethanol on *Tetrahymena thermophila*

Ethanol is the principal type of alcohol found in alcoholic beverages. It is a neurotoxic, psychoactive drug, and one of the oldest recreational drugs. Excessive and prolonged drinking of alcohol has been shown to be connected to heart, kidney and other major organ diseases. Oxidative s tress (OS) reflects an imbalance between the systemic manifestation of reactive oxygen species and a biological system's ability to readily detoxify the reactive intermediates or to repair the resulting damage. OS has been implicated in aging and in diseases such as cancer, diabetes and cardiomyopathy. *T etrahymena thermophila* is a eukaryotic cell and a freshwater organism that inhabits streams, lakes, and ponds. It is used for quick, reliable, sensitive and inexpensive bioassays and as a reliable model for eukaryotic cells. We examined the effect of ethanol on *T etrahymena thermophila* . We hypothesized that Ethanol would increase OS in *T* . *Tetrahymena* and affect genes involved in oxidative stress. Compared to concentrations of up to 500 mM of ethanol, 750 mM resulted in significant cell death within 4 h. By 24 hrs. 100% of cell were dead. PCR results showed an increase in most oxidative stress gene tested within 4 hrs of incubation with 500 mM of ethanol but decrease expression levels at

750 mM. These results suggest high concentration of ethanol is toxic to *T. thermophila* and furthermore, this toxicity may be as a result OS.

Student: Osvaldo Gratereaux

Mentor: Prof. Ellie Mallardi

Title: Recent Advancements in Sound Technology Present Increasingly More Memorable Experiences.

Introduction: The quality in modern day technologies gives our world wonderful experiences as it continues being rendered higher and higher. Now, thanks to the many advancements being made, high definition audio is reshaping the entertainment business in all.

Method: A combination of descriptive and qualitative research were used, and frequent questions on sound technology were asked to working professionals. Literature review research on recent sound technology and sound design magazines. The research setting took place at New York City College of technology Library, laboratory at the Voorhees building, NYC public library, and an over the phone interview with valued professionals.
The two interview were made with sound professionals named Alexandria Bottiglieri and Robert Palagia. They were referred to the author (Osvaldo) by the editor (Ellie) who also works in the entertainment business as well. They were selected for their experience, camaraderie, value, and many recognitions.

Robert works in live sound and started booking shows at punk rock shows, and skate parks moved to promoting and then stage setup's, stage hand, audio, house gig, touring the world working with many productions, and now he works for IATSE Local One. Popular sound technology in live audio and musical venues is JBL Vertec. Alexandria is a sound mixer and started as a performer, did some backstage work. She designed composed sounds using Yamaha console Myers audio and Shure wireless. Worked at theatre, corporate events, and concerts and is now working at NYCCT as a sound designer.

Results: The Entertainment business is a growing business and is highly needed everywhere. The technology in sound provides great support in making people and viewers happy. Sound professionals are a huge part of the productions and everyone's contribution makes the entire production an amazing place to work. Some widely used technologies for sound professionals are JBL vertec, Yamaha, Myers, and Shure wireless. The 2016 new technological advancements in audio have made the overall audio and sound design more efficient. The ZEDi – 10FX designed for creating studio quality sound effects. Mackie –Master Fader v4.0 control app is a control for mackie's DL32R digital mixer. This makes the integration of ipads, iphone, and iPod for personal monitor mixing. Peavey Dark matter Speakers has new DSP equipped power section, it's designed to outperform any existing enclose in its category.

Conclusion: Leading Sound Technology with mixers, effects players, and speakers play a vital role on how clear the sound is being produced throughout the speakers. The Mackie -Master Fader v4.0 mixer make it extremely easy for users to simple connect their wireless devices create a mix and add many different effects with Allen & Heath ZEDi – 10FX mixing Analog console and then transmit it through the powerful Peavey Dark matter -Speaker enclosure. These three equipments combined alone can support a large venue with no technical failures with added technical support. Our future in sound technology is more efficient and will bring many productions to create intuitive experiences, thanks to the many advancements.

Equipment	New Technology	Past Technology

Digital Mixer	Mackie -Master Fader v4.0	Behringer- X32
Speaker	Peavey Dark matter -Speaker enclosure	Electro-Voice ZLX-15P
Effects Box	Allen & Heath ZEDi – 10FX mixing Analog console	Alesis MULTIMIX 8-USB mixing analog console

Student: Ching Hin Ho

Mentor: Prof. Mariya Bessonov

Title: Population Models in Mathematical Biology

In this research, an approximation to the Bolker-Pacala (BP) population model is investigated. The Bolker-Pacala model is a stochastic spatial model that incorporates both spatial dynamics and competition. We consider a mean-field approximation to the BP model by assuming that the migration is uniform within a square plot of land inhabited by the individuals in the population. The size of the population at a given time is represented by a `logistic' random walk, which is depends on the birth and death rates. When the biological death rate is greater than the biological birth rate, the population will eventually die out with probability 1. In this research, the logistic random walk is simulated by software R, and the simulations are used to predict how quickly the population is expected to die out, starting from a large size.

Student: Warren Hunter

Mentor: Professor A. Zhang

Title: Multirotor Design and Infrared Tracking System for Search and Rescue

The increased use of new technologies, such as autonomous multirotors, in emergency situations can serve multiple purposes. First, when natural or man-made disasters occur, newer technologies such as autonomous multirotors can be most effective by allowing us to keep humans out of hazardous and unstable conditions without delaying the collection of data and the delivery of aid to persons in need. Second, autonomous multirotors can provide an alternative to older technologies in situations where they may be less effective or have unintended drawbacks. This research project asks two questions. First, what materials and processes are necessary to design a multirotor system that can be effectively deployed for use in emergency situations. Second, can an infrared tracking and docking system be designed that improves the utility of autonomous vehicles as a tool for first responders and search and rescue personnel. The current research will be used in the future in an attempt to create a prototype autonomous search and rescue multirotor carrier system that will demonstrate the ability of multiple quadcopters to detach from a carrier base, execute a search of a specified area while gathering sensor data, and then return to the carrier and dock autonomously via the infrared tracking and control system.

Student: Rafael Lopez

Mentor: Prof. Eli Neugeboren

Title: "No Sinners Left Behind," An Original Comic Book

My goal for the CSURP program was to write and draw an illustrated narrative. I had several ideas going into the month of June but quickly settled on "NO SINNERS LEFT BEHIND" A story about a string of murders

that leave a young boy by the name of Thomas and his baby sister without a mother or a home. Thomas finds himself having a hard time being raised in an orphanage. Thomas is taken in by a church whose priest takes desperate measures to raise church attendance and instill religion to a society consumed by social media and technology.

I was motivated to construct a graphic narrative because it utilizes a skill set that is parallel with my academic goals. A graphic narrative can have multiple purpose such as inform, persuade, create artistic expression, and entertain. As an inspiring graphic designer, constructing an ad campaign, a magazine layout, or even packaging for a product employ the same principles that go into making a graphic novel. Illustration, typography, page layout, color correction, and story boarding are all techniques I need to master in order to be successful as a graphic designer, and I used all of these skills in creating my graphic novel.

In my research project I created an original narrative. The progress was more difficult than expected and is still on-going. Finding the right story to tell was the first step, then I put many hours into plot and script development. The next step was to create characters and environments that not only fit the narrative but had designs that added substance and purpose to the narrative. During this process the presentation and final output of the project was constantly kept in the forefront of my mind. The design of the characters included establishing their anatomy, their psyches, their relative size, their importance to the overall narrative, their relationship with one in another, and the style in which they would be illustrated.

It was a challenge to create a unique drawing and writing style that represented me as an artist, as well as the story I wanted to tell. These problems were solved by establishing a foundation to the characters, which I began by conducting research. [What kind of research did you do? Write a sentence two about the research that went into the writing.] Learning various drawing rules such as anatomy and proportion and then breaking them down. I researched artists that seem to convey a similar narrative and aesthetic. As the narrative progressed, re-writes and re-designing characters were necessary.

As my work progressed, I realized everything was susceptible to change. Further work is needed to complete my project: I must continue to reshape and mold the plot, script, and character design to achieve completion. As I push forward my skill set can only improve which will give me a better chance at success as a graphic designer.

Student: Kingsley Okolo

Mentor: Prof. Ralph Alcendor

Title: Effect of NaCl on *Tetrahymena thermophila*

Oxidative stress is an imbalance between the levels of free radicals and the ability of the body to counteract their harmful effects. Antioxidants are molecules present in cells that prevent these reactions from causing damage to molecules and important cellular processes. *Tetrahymena thermophila* is a single-celled model organism for unicellular eukaryotic biology. Studies of *T. thermophila* have contributed to many discoveries such telomeric repeats, telomerase, and the function of histone acetylation. *T. thermophila* is a great model eukaryotic system because it divides rapidly, and expensive facilities are not required. In addition, these cell types possess many important processes found in eukaryotes. NaCl is an important ingredient in our diet. Excess dietary salt is a major cause of hypertension and heart related illness. Salt increases arterial constriction and peripheral vascular resistance, and thereby raises blood pressure. To better understand the impact of NaCl on eukaryotic cells, we examined the effects of NaCl in *Tetrahymena thermophila*. We hypothesized that NaCl will increase OS in these cells and affect antioxidant genes. High concentrations of NaCl reduced *T. thermophila* ability to survive. At 150 mM of NaCl most cells were dead within 4 h. The expression levels of most antioxidant genes tested increased at 20 mM. However, at 100 mM and above the expression levels of

these genes decreased dose dependently. These results indicate that NaCl can be toxic to these cells. In addition, NaCl is capable of inducing OS and altering the expression levels of antioxidant gene.

Student: Leroy Strother

Mentor: Prof. John McCullough

Title: The Evolution of Fire Safety and its Progress: Trust in the American Assembly

When we look at the history of theatre visits over the past century, when a patron wanted to view a performance, the risk of being injured, maimed or killed was great. Most theatres were made of wood and had elements on the premises that increased the risk of fires, not to mention overcrowding, and no fire codes to protect the audience or the talent that were performing. How much do we know about the assembly in regards to our safety? Are the theatres fire codes up to par? I will review the National Fire Protection Association (NFPA) to determine if the venues apply the safety codes for buildings of assembly.

- My Case study will be the two biggest fires in theatre history, The Brooklyn Theatre and the Iroquois Theatre

- The evolution of fire safety and why we have these codes in place

- Are any Patrons or entertainers familiar with fire safety

Student: Danielle Telemaque

Mentor: Prof. Navid Allahverdi

Title: Structural Health Monitoring of Bridges

Existing steel and concrete bridges in the US are in critical need of repair and upgrade; Active monitoring of structural health of bridges enables engineer to identify and prevent potential bridge collapses. In this research project, focus was spent on identifying and comparing methods to monitor existing structural health condition of bridges. Through thorough research and lab testing, fabricated steel segments were tested for the strengths and limits of strength for steel. Such beams were connected via a hook and clasp method (spring connection), with a weld steel plate at the bottom to join the two for a sturdy connection. Testing of the steel beams were conducted in order to detect the moment curvature and load deflection of the bridge. The objective was to obtain a moment curvature that was rigid in strength, expressing that the beams spring constant was high, which reflects ultimate strength. The results showed a moment curvature higher than what was expected, showing that the design of the connection was somewhat ideal. Results in deflection and moment curvature are able to showcase how strong a structure is, and present opportunity to determine what can be done to make them stronger if they fall below the strengths necessary for safety. Different instrumentation methods to measure strain, deflections, accelerations, and crack growth as parameters for assessing the state of the health of bridges, were also reviewed. Further studies will include creating a mobile app that allows for the results of a wireless sensor on a bridge to determine the deflection and moment curvature of bridge structures.

Student: Ryan Wagner

Mentor: Prof. Douglas Moody

Title: Pedagogical Techniques in Introductory Programming Course

Recently there has been a great deal of attention relating to the pedagogy of computer programming. As the subject of computer programming moves down from the college level to high schools and even primary schools, educators are looking at more effective method to teach students the basic of computer programming. These basics include the logic paradigms of loops, IF THEN else constructs, methods or subroutines and basic memory management techniques such as arrays.

A key aspect of learning any discipline or skill is practice. Typically, computer science educators assign several programming exercises for completion during any lesson or class term. While the exercises are designed to focus on a particular programming paradigm, often these exercises demand the student learn how to solve new problems first, before beginning a known solution process into computer code.

This paper looks at the importance of the topic of the problem and the student's familiarity with its non-automated solution. We look to show that exercises involving problems already faced by students in actual life situations provide a better base for computer programming skill development, than problems foreign to the student's experience. This relationship between familiarity and student performance, we believe, is strong and hence the topic of the problem be considered more strictly when assigning programming exercises.

Student: Meleha Yousaf

Mentor: Prof. Gaffar Gailani

Title: Theoretical Analysis of the flow through the cement line of a single osteon

Osteons are semi cylindrical porous structures saturated with flowing and are approximately 250 micrometer in diameter; their outer boundary is called the cement lune. Cement lines are formed by osteoblast and they recognized between old and new bone. The thickness of cement line is approximately 2μ. There is uncertainty in the degree of permeability of the cement line. Some authors suggested that it is fully impermeable whole others suggested existence of some permeability. In this communication we investigate different degrees of permeability controlled by leakage parameter and the relation between the degree of permeability and the pore pressure. In this theoretical analysis the osteon is subjected to unconfined compression under harmonic load. Stress tensor and continuum mechanics constitutive relation are employed. A leakage parameter is introduced to estimate the fluid flow through the cement line. We developed analytical method to estimate the pore pressure distribution and the effects of leakage. A computer code was written in Matlab software to generate graphical data to represent the pressure distribution. Advanced programming techniques such as looping were incorporated to evaluate sensitivity of the results with respect to certain parameters such as leakage and permeability. The results are very reasonable and we are in the process of writing a journal paper to disseminate these results.

Student: Mei Zhu

Mentor: Prof. Mariya Bessonov

Title: Population Models in Mathematical Biology

This research focuses on the Bolker-Pacala (BP) population model, a spatial stochastic model for population dynamics that incorporates birth, natural death, and competition. In our approximation to the BP model, we assume that all individuals live in a large square plot of land, and we assume that the migration is uniform with the square. There are no individuals outside of the square.

The size of the population is represented by a ``logistic'' random walk on the positive integers with transition probabilities to the left and right depending on the present population. A transition to the left (-1) indicates a death (natural or due to competition) and a transition to the right (+1) indicates a birth. When the birth rate exceeds the death rate, the random walk has an equilibrium point, x*.

The goal of this research is, given that the random walk begins at x*, to find the maximum distance in either direction the particle travels from x* and how many times is x* visited. The statistical package R is used to simulate the model and predict the behavior of the random walk.