

Student Research Symposium 2004 Abstract Contents

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A Researched Review on Cooperative Learning and Jigsaw

Amanda Bergamasco, Ann Marie Hernandez, and Sharon Vizcaino

Division of Education

Farquhar College of Arts and Sciences

Faculty Advisor: **Dr. Patrice LeBlanc**

Abstract

The topic of this literature review is to understand the effectiveness of the cooperative learning model and one strategy, jigsaw. The goals of the review are to identify the population for which the model and strategy are used, whether or not the use of this model is successful in the classroom, and to understand what successful outcomes are possible with the model and strategy. Additionally, the instructional cycle for cooperative learning and jigsaw are explored. Our review concludes that the use of cooperative learning and jigsaw can be used with varying age groups successfully. Proper teacher planning, instructing, monitoring, and evaluation ensures the growth of student achievement. Finally, use of cooperative learning will significantly benefit educators with their time management.

Adhesion of Transferrin to FDA Group I Contact Lenses

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Farquhar College of Arts and Sciences

Faculty Advisor: **Dr. Edward O. Keith**

Abstract

Contact lenses are widely used to correct vision. The adhesion of tear proteins to contact lenses contributes to lens deterioration, and may lead to vision problems and ocular pathology. Tears contain a large number of proteins, among them being lysozyme, albumin, transferrin, lactoferrin, immunoglobulins and tear lipocalin. Here we report studies of the adhesion of transferrin to FDA group I (low water non-ionic polymer) contact lenses. Lenses were incubated in a solution of transferrin for 1, 2, 3, and 4 days, and transferrin adhesion was determined using the bicinchoninic acid (BCA) assay. Transferrin adsorbed to the Group I lenses in a steadily increasing pattern, which resembled the pattern seen with albumin but not with lysozyme. In contrast, the adhesion of transferrin to Group IV lenses (high water ionic polymer) resembled the pattern seen with both albumin and lysozyme. Average transferrin adhesion to all Group I lenses was 96 ug/lens (± 10), as compared to 70 (± 13) for lysozyme and 60 (± 24) for albumin.

Adhesion of Transferrin to FDA Group IV Contact Lenses

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Abstract

Contact lenses are widely used as a replacement for eyeglasses to correct vision. The adhesion of tear proteins to contact lenses contributes to lens deterioration, and may lead to vision problems and ocular pathology. Tears contain a large number of proteins, among them being lysozyme, albumin, transferrin, lactoferrin, immunoglobulins and tear lipocalin. Here we report studies of the adhesion of transferrin to FDA group IV (high water ionic polymer) contact lenses. Lenses were incubated in a solution of transferrin for 1, 2, 3, and 4 days, and transferrin adhesion was determined using the bicinchoninic acid (BCA) assay. Transferrin adsorbed to the Group IV lenses to a significant degree after one day, and then remained elevated for the remainder of the experimental period. This pattern of adhesion resembled the pattern seen with lysozyme and albumin. In contrast, the adhesion of transferrin to Group I lenses (low water non-ionic polymer) resembled the pattern seen with albumin, but did not resemble the pattern seen with lysozyme. Average transferrin adhesion to all Group IV lenses was 116 ug/lens (± 43), as compared to 92 (± 6) for lysozyme and 49 (± 4) for albumin.

Application of openMosix Computer Clusters for Acceleration of Distributed and Parallel Computational

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Farquhar College of Arts and Sciences

Faculty Advisors: **Dr. Matthew He and Dr. Raisa Szabo**

Abstract

The openMosix is an Open Source extension to the Linux kernel. This kernel extension turns a network of ordinary computers into a supercomputer for Linux applications. Such cluster has proven to be extremely low maintenance yet very useful in solving computational problems in the areas of distributed and parallel computing such as compression, cryptography, mapping and neural network algorithms. The presentation will attempt to explain the basic configuration and the inner workings of such cluster.

Caffeine effects on the predatory behavior of the orb-weaving spider, *Argiope argentata*

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Farquhar College of Arts and Sciences

Faculty Advisor: **Dr. Michael Justice**

Abstract

Argiope argentata are orb-weaving spiders--meaning that their webs are a sticky spiral wound around radii extending from a central hub. *A. argentata* have poor vision and depend on vibrations in their web for detection of prey. *A. argentata* are large spiders; the female is 25mm and the male is 10 mm. They build webs that are approximately 80cm across. Research thus far on spiders and drugs have focused on web-building behavior after depressants or hallucinatory substances have been administered. Research on stimulants and predatory behavior has not been addressed. The proposed research is an exploratory study investigating the effects of stimulants on predatory behavior in *A. argentata*. This study will be a between-subjects experiment with two groups. A control group will be used for baseline measures of predatory behavior. An experimental group will be administered caffeine prior to the measurements of predatory behavior. A prey item is simulated by use of a 100 Hz tuning fork. The fork is struck and the tine is placed in the web to create a vibration. Responses are scored from no response to full response. A full response score is given if the spider approaches the fork as they would a prey item. It is unknown what effect the caffeine will have on predatory behavior.

Chaperoning Disease Treatment into the 21st Century

Maria Farrell

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Faculty Advisor: **Dr. Emily Schmitt**

Abstract

Chaperones function as the cell's quality control system in a number of different ways. Simply put they are protein complexes that help fold new proteins into their working form, refold proteins that have been damaged, protect against protein aggregation, and tag severely damaged proteins for degradation. Because they most notably respond to damaged proteins caused by cellular environmental stresses such as proteotoxic heat shock, they are often called heat-shock or stress proteins and are classified by their molecular size, cellular compartment and function (e.g. Hsp 90). The chaperones are ligand specific, cylindrical protein complexes that make life and death decisions about the ultimate fate of proteins. Through recognition of motifs, exposed hydrophobic regions, or ubiquitin tagged sequences, proteins leave the chaperone being properly folded, are sequestered by the cell, or they are disassembled by proteolytic active sites. Interestingly, chaperones have the ability to overlook minor mutations in polypeptide chains before they are folded into higher level structures, which allows the protein to be able to function normally. The purpose of this literature research project is to investigate a novel approach to disease treatment, the targeting of chaperones. This paper will summarize what happens to the cell when the chaperone is overloaded with mutated proteins, oncogenic proteins are favored over normal ones, or the chaperone becomes too picky with regard to understanding origins and treating diseases as diverse as Alzheimer's disease, cancer, and cystic fibrosis.

Discovering and Analyzing the Patterns of Tripeptides

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Faculty Advisors: **Dr. Matthew He**

Abstract

A tripeptide is a peptide containing three amino acids. Amino acids are the building blocks of proteins. Like DNA and RNA, proteins are synthesized as linear polymers (chains) composed of smaller molecules, in this case amino acids. Unlike DNA and RNA, in which there are four nucleotides from which to choose, proteins are constructed from at least 20 amino acids having a variety of sizes, shapes, and chemical properties. Each amino acid has a backbone consisting of an amino (NH_2) group, an alpha carbon, and a carboxylic acid (COOH) group.

The order of the amino acids in a protein's primary sequence plays an important role in determining its secondary structure and, ultimately, its tertiary structure. The sequence of amino acids that comprise a protein completely determines its three-dimensional shape, its physical and chemical properties, and ultimately its biological function. The main objective of this project is to investigate relationships and applications of 8000 possible tripeptides using statistical methods and computer software programs to explore the Protein Database Bank (PDB).

DNA Microarrays and Pharmacogenomics

Daveda Maharaj

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Farquhar College of Arts and Sciences

Faculty Advisor: **Dr. Emily Schmitt**

Abstract

DNA microarray technology applied to the field of pharmacogenomics will provide for a better analysis of drug responses and drug efficacy in treating individuals with varying genotypes. DNA microarray technology is useful in the detection of various Single Nucleotide Polymorphisms (SNPs) that have a propensity to inhibit or complement drug efficacy in individuals using particular medications. Since microarrays allow for the study of groups of genes expressed or repressed among various environments, this technology has allowed for the fields of pharmacogenetics as well as pharmacogenomics to flourish by studying individuals administered medications for their particular illness. While the field of pharmacogenetics examines the effect of drugs to treat variations in a single or few alleles, pharmacogenomics focuses on the identification of many genetic variations within and among individual patients that impact the efficacy of drugs. The purpose of this literature review project is to study ways in which pharmacogenomics has been conclusive in detecting varying levels of drug efficacy for individuals with different genotypes such as altered debrisoquine metabolism, ultrarapid metabolizers, DNA amplification, treatment of airway disease as seen in the 5-lipoxygenase gene and in the study of Arylamine N-acetyltransferases.

Doing Math with Mathematica

Bini Anchery

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Faculty Supervisor: **Dr. Fuzhen Zhang**

Abstract

The purpose of the poster will be to introduce Mathematica to those who are unaware of the topic and explain its capabilities.

It is a powerful tool that combines graphics, programming language, numeric and symbolic computations to other applications. It has a wide range of uses such as handling complex calculations that involve thousands of terms, giving technical presentations and seminars and doing numerical simulations that range from finding the derivative to chemical reactions.

As the individual works through the problems, a notebook keeps a complete report of the input and output, etc.

Symbolic programming is the basis for Mathematica. This is what allows Mathematica to take place.

Mathematica is not limited to only the field of mathematics. Many other sciences take advantage of this powerful tool as well. They include but are not limited to engineering, finance/economics, life sciences, and chemistry and chemical engineering.

Exploring the Self-Esteem of Dually-Diagnosed Homeless

Nicole Russo

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Farquhar College of Arts and Sciences

Faculty Advisor: **Dr. Michael D. Reiter**

Abstract

According to the 1997-1998 annual report from the United States Department of Children and Family Services the steady increase of homelessness in our nation is astonishing (U.S. Dept. of Children & Families, 1997-1998). Among the homeless population, 26% are mentally ill as well as substance abuse problems and they are classified as dually-diagnosed. Dually-Diagnosed Homeless Individuals are an extremely vulnerable subgroup with poorly understood needs (Drake, Osher, & Wallach, 1991). There has been paucity in research focusing on personality characteristics on dually-diagnosed homeless, especially in the area of self-esteem. The implications of a dually-diagnosed homeless individuals' self-esteem and how it might affect them are unclear. The present study addresses this concern and explores self-esteem using the Rosenberg Self-Esteem Scale on dually-diagnosed homeless individuals. The Rosenberg Self-Esteem Scale is a global and one-dimensional ten-item Likert scale self-report. The scale has relatively consistent validity scores ranging from .60-.67 and reliability scores ranging from .73-.87 (Rosenberg Self-Esteem Scale, 2003). Participants in this study were recruited from local transitional housing facilities, malls, places of business, and doctor's offices. Data were derived from a sample of convenience on two groups, dually-diagnosed homeless single males between the ages of 30 thru 60, and neither dually-diagnosed nor homeless single males between the ages of 30 thru 60. Preliminary data analysis will be given utilizing a *t*-test to examine if there is a significant difference in Self-Esteem between the two groups. The alpha level will be set at .05.

Friendships Across The Lifespan

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Faculty Advisor: **Dr. Marcia E. Silver**

Abstract

During infancy we begin to develop social skills and learn how to deal with the people around us, especially family and friends. During infancy, we develop different types of attachment styles. Studies show that about 70% of infants acquire a secure attachment style, in which the infant uses the mother as a secure base, but ventures off to explore the surroundings. About 10% develop a resistant style, in which the infant remains near their mother but resists physical contact with her and may even hit or kick her. This infant is wary of strangers. Another 15% develop an avoidant style, where the infant is not interested in exploring their surroundings. They are not wary of strangers, but ignore or avoid them just as they do their mothers. A small percentage of the infants develop a fearful or disorganized attachment. This style reflects the infant's insecurity and confusion about whether to approach or avoid a parent. Many of these infants have been abused or neglected by a parent and does not have strategies to cope with negative emotions and are hesitant to approach their parent. Friendships and relationships are essential to the normal cognitive, social, and emotional development of a person. Hence, it is essential to enjoy a secure bond with at least one caregiver during infancy, a close friendship during childhood and adolescence, and an intimate romantic relationship or friendship in adulthood. These factors not only contribute to a satisfying life, but also our well-being and normal development.

Inverse correlation between water temperature and the presence of Florida manatees (*Trichechus manatus latirostris*) at Port Everglades, FL.

Lindsey Fulcher

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Faculty Sponsor: **Dr. Edward O. Keith**

Abstract

Florida manatees are known to be intolerant of cold water. Prolonged exposure to cold water will cause a pathological cold stress syndrome. For this reason, during the winter months, manatees tend to aggregate at sources of warm water, such as springs and power plants, or to migrate south to find warmer waters. Port Everglades, the port of Fort Lauderdale, FL, is a well-established manatee refuge during the cold weather months. The presence of manatees and the temperature of the water near the Florida Power and Light electricity generating plant were monitored for calendar 2003. Water temperatures in other parts of the port were also monitored. The results indicate that manatee presence was correlated with colder waters, both in the effluent canal and elsewhere in the port, during the winter months. During the other times of the year, water temperatures were warmer, and no manatees were observed. The average temperature of the water in the FPL effluent canal was 88.87 degrees Fahrenheit (± 11.53 SD) while the average temperature elsewhere in the Port was 76.24 degrees Fahrenheit (± 9.57 SD). Interestingly, the difference in water temperature was greater in the summer than in the winter ($P < 0.01$).

L-selectin and its Probable Effects on Embryonic Development

Nancy Philippe

Division of Math, Science, and Technology
Farquhar College of Arts and Sciences

Faculty Advisor: **Dr. Emily Schmitt**

Abstract

The intent of this literature review project is to summarize research that provides a new way to look at properties which dominate and regulate the molecular mechanisms that determine whether an embryo will implant itself or not. The main quest of this research was to determine if L-selectin is used by the trophoblast as an adhesion factor at the beginning of embryonic implantation. Maternal uterine epithelia was examined further to see if it produces L-selectin ligand during the same time period at which the trophoblast exhibits the L-selectins. The primary role of selectins is to promote the rolling and adhesion of leukocytes to endothelial cells as well as diapedesis, which is the ability of leukocytes to diffuse, without rupturing, through the blood vessels and into the surrounding tissues at the site of inflammation. One of the many causes of miscarriage is the failure of the developing embryo to bury or embed itself properly into the mother's uterine epithelia (mother's womb lining). Out of all the possible pregnancies, 50% of them will be miscarried before implantation and 30% of them will be miscarried shortly thereafter. Even with all the advances in reproductive treatments, one major problem still remains: how to get the transplanted developing embryo to attach and stay attached to the mother's uterine lining. This research finding would form the basis of understanding factors that affect embryonic implantation.

Microarray Analysis of *Saccharomyces cerevisiae* Exposed to Various Conditions

Michelle Jaffe, Stephen Berkowitz, Daveda Maharaj, Gelin Fils-Amie, Jr., and Roxana Ruyani

Division of Math, Science, and Technology
Farquhar College of Arts and Sciences

Faculty Advisor: **Dr. Emily Schmitt**

Abstract

DNA microarrays offer the ability to produce genome-wide gene expression profiles, which can be used to identify genes that may play an active role in various biological processes. The well-studied organism *Saccharomyces cerevisiae* was used in an attempt to utilize DNA microarrays in order to examine the gene expression profiles of yeast exposed to varying conditions: aerobic versus anaerobic environments, glucose versus lactose media, weak versus dense cell cultures, and non-UV-C versus UV-C light exposure. After growth reached an optimum optical density, yeast cells in each culture were lysed and the RNA was isolated and transformed to cDNA. Finally, the cDNA was treated with a series of reagents (including fluorescent labels to mark cDNA from each environment) and washed to hybridize the cDNA to the microarray. The microarrays were then scanned and, had quantifiable results been obtained, these data would have been further examined with information technology in order to verify the expected expression patterns of genes involved in biological processes pertaining to each experimental condition. Although this first attempt at DNA microarray analysis did not yield analyzable results, RNA was successfully extracted and quantified from all cell cultures and the knowledge and understanding gained throughout the procedure will prove invaluable, especially when applied to future genomic explorations.

Microarray Technology: New Strategies in the Discovery of the Etiology of Schizophrenia

Roxana A. Ruyani

Division of Math, Science, and Technology
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Faculty Advisor: **Dr. Emily Schmitt**

Abstract

Schizophrenia is a complex trait disorder attributed to polygenic and epigenic factors linked to over ten chromosomal loci that are responsible for symptoms reflecting multiple mental processes such as hallucinations, delusions, and disorganized speech and behavior. Numerous studies implicate the profound effects of both genetic and environmental factors on neurodevelopmental processes to conclude that the function of the nervous system is highly dependent on gene expression. The objective of this literature research project is to summarize the application and major conclusions of two DNA microarray research procedures executed in an attempt to identify the causes and genes attributed to Schizophrenia. Microarray methodology is a high-throughput method that has been used to simultaneously examine the differential expression of large numbers of genes extracted from postmortem brain tissue. The first research article evaluated Schizophrenia as a disease of the synapse by utilizing cDNA microarrays to examine expression levels of genes encoding regulatory proteins for presynaptic function. The second research article analyzed signature differences of gene expression in the prefrontal cortex attributed to the disease. The major conclusions obtained through this research have been used to identify possible candidate genes that are partly responsible for the etiology of Schizophrenia, such as PSYN, RGS4, HINT, UBE2N, and GRIA2. Future research may lead to therapy and drug targets used to manipulate the expression of these gene groups in an attempt to cure or possibly prevent the onset of Schizophrenia.

Obesity in Immigrants

Ana Rodriguez

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Farquhar College of Arts and Sciences

Faculty Advisor: **Dr. Robert Seifer**

Abstract

Obesity is one of the main health problems in the United States. The number of immigrants is increasing dramatically over the years. (Satia-Abouta, Patterson, Neuhouser, Elder, 2002). Immigrants to the U.S. often acquire new eating patterns as they become accustomed to the American products, fast-food culture and sedentary lifestyle. The acculturation to the American lifestyle places immigrants at risk for obesity. (Thompson, Coronado, Solomon, 2004). The purpose of this research is to create an awareness of the problem immigrants are having when immigrating to the U.S. Since this problem could be the cause of more health problems such as hypertension, diabetes, and psychological problems such as social anxiety and depression. (Smith, P.K, Bogin B., Varela-Silva, M.I., Orden, B., Loucky, J., 2002). My goal is to encourage the immigrants to maintain their dietary patterns and high physical activity levels in order to reduce the risk of obesity. In addition, I would like to encourage researchers to find a cause and a solution to this problem.

Orientation Preferences in Birds

Lessette Magnotta

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Farquhar College of Arts and Sciences

Faculty Sponsor: **Dr. Michael Justice**

Abstract

Most bird species have a dark dorsum and lighter ventrum. A possible explanation for such a color pattern could be countershading, which makes a bird less conspicuous to predators. The level of conspicuousness depends on the orientation of the bird with respect to the sun. In order for the bird to successfully camouflage itself, it must face its dorsum towards the sun when the sun is at low elevation. The purpose of this study was to investigate whether countershaded and non-countershaded birds do in fact orient with respect to the sun. A goniometer was used to measure angles of perches with respect to the sun. *G* statistics were used to determine the goodness-of-fit of the sample to the null hypothesis of random orientation. Several birds were found to hold an orientation preference while others were not. Orientation preferences varied. Many of the species that did hold an orientation preference tended to face the sun. However, a few were found to either face sideways or away from the sun. The data indicate that color pattern and perch orientation are related.

Project X: The Design and Development of An Amateur Rocket

Jason Fraser, Dennis O’Leary, and Erin Ostroff
Division of Math, Science, and Technology
Farquhar College of Arts and Sciences

Faculty Sponsor: **Dr. Diego Castano**

Abstract

The goal of this project is to research, design, and develop a launch vehicle capable of lifting three eggs to over 150 meters and return them intact to earth using commercially available, non-certified rocket engines, namely, A-G class engines whose total integrated impulse does not exceed 160 Newton-seconds. The construction of the vehicle conforms to the safety code of the National Association of Rocketry (NAR).

Racial Attitudes: The Effects of Segregation on College Students

Micaela Mercado

Division of Social and Behavioral Sciences
Farquhar College of Arts and Sciences

Faculty Advisor: **Dr. Marcia E. Silver**

Abstract

This study focused on racial segregation experienced in high school by college students and their subsequent attitudes toward race. Kenneth Clark in the landmark *Brown v. Board of Education of Topeka* clearly demonstrated that psychological inferiority as a result of segregation greatly affected children's self-esteem and self-image. In the present study, differences in racial behaviors and attitudes in relation to gender, ethnicity, and level of segregation in high school were explored in 52 undergraduate college students. Findings indicated differences of racial attitudes among male and female students. In one comparison between the genders, females exhibited less racial discomfort in relation to discussing racial issues than males. Surprisingly, this study also demonstrated significant differentiating attitudes between African- Americans and Caucasian students. Differences were observed in African- Americans' feelings towards limitations on opportunity as a result of their race, compared to that of Caucasian students. Overall, findings support the notion that racial attitudes are still very existent within our society and play an intricate role in our psychological well-being.

Radio Telescope Project

**Andrew Barry, Jessica Davis, Jordan Gularek, Po-Jui (Bryan) Lin, Dennis O'Leary,
Erin Ostroff, Graham Rasenen, and Kareem Shaker**

Division of Math, Science, and Technology
Farquhar College of Arts and Sciences

Faculty Sponsor: **Dr. David Simon**

Abstract

Burke and Franklin discovered that Jupiter emits radio waves through the construction on antenna much like Radio JOVE project. Jupiter has an extremely large magnetosphere, which allows Jupiter to emit radio signals that can be received on earth. The moon Io leaves behind large clouds of charged particles as it orbits Jupiter due to its volcanic atmosphere, which interacts with Jupiter's magnetosphere causing radio storms. The position of the sun can have a large effect on the incoming radio signals to Earth because the sun ionizes Earth's magnetosphere causing the absorption of radio waves. The position of Jupiter is also important when listening to radio waves, the best being when Jupiter is in superior conjunction. There are two types of signals being listened to: L-bursts and S-bursts, which result from three different storms: Io-A, Io-B, and Io-C. The best storm to receive signals from is the Io-B storm. Storms were predicted by using tables provided by the University of Florida Astronomy Department website, the Radio Sky Pipe software, and the Radio JOVE website. The storms usually occurred every thirty-five days and signals were recorded for approximately five hours.

Two pieces make up the Radio JOVE project: the antenna and the receiver. The antenna is composed of two dipoles consisting of copper wire, insulators, and coax cable, which together allow incoming signals to be sent to the receiver without being lost or distorted. Signals are coming in 20.1MHz, and are amplified by the receiver and are converted into audio signals.

Rhetorical Criticism as a Method of Understanding History and the Art of Persuasion

Cammie Cacace and Theodore Chamberlain

Division of Humanities
Farquhar College of Arts and Sciences

Faculty Sponsor: **Ms. Jennifer Reem**

Abstract

U.S. history has been shaped by the speeches of great individuals. Democracy is built upon freedom of speech, which allows even the least privileged to speak the truth and their concerns to those in power. Those of privilege have given many of the great speeches in our history. However, some of the best have been delivered on behalf of all people in this country, and in the world. It is important that these archives of freedom and democracy be studied not only so we can understand the power of political rhetoric, but so that we can understand the events that have shaped our country.

In this class, our capstone assignment was to present a speech of rhetorical criticism. We learned principles of rhetoric—classical and modern—and used these as methods for analyzing speeches. The research into the methods and speeches was the main component of the assignment. The results were presented in an oral report to the class. First, we selected a speech that interested us. Then we decided what about the speech was compelling and selected a rhetorical method by which to critique it. Finally, we conducted the analysis and shared the results. The speeches studied ranged from FDR's "Day of Infamy" to Mother Theresa's "Give Until It Hurts" to Margaret Chase Smith's "Declaration of Conscience". We concluded that by studying the structures of language, organization, content, and delivery, a great deal could be learned about public speech.

Rocket and Egg Drop Project

Rezwan Alam, Andrew Barry, Nika Ferdowski, Adam Finkelstein, and Fahd Sattar
Division of Math, Science, and Technology
Farquhar College of Arts and Sciences

Faculty Sponsor: **Dr. David Simon**

Abstract

Our project is to use our knowledge of kinetic energy, aerodynamics, and shock absorption to build our own rocket. These aspects of mechanical physics will determine the height of our launch and the physical strain on the rocket's structure. In order to measure the effects of these acting forces, we will design, build and launch a rocket without the aid of a modeling kit.

This rocket will be used in an experiment to test the limits of its performance with respect to its passengers. Our rocket will launch with three eggs inside of it. These eggs will act as a gauge, measuring the forces that act upon our homemade rocket. In order to succeed in building a structurally sound rocket, these eggs must remain unbroken from the time of launch to the time of impact.

Using the eggs as a guide, we hope to accomplish the goal of this project: to balance the many variables in building a rocket to their most optimal state. This task includes maximizing the height of the launch while minimizing the cost of building it. One way to do so is to minimize the weight of the rocket; the thruster will have less mass to accelerate. However, the rocket must still be sturdy enough so that the eggs do not break during the flight.

Role of Beta-Amyloid ($A\beta$) Protein in Alzheimer's Disease, and the Controversy Surrounding PIB-PET Imaging

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Abstract

Alzheimer's disease (AD) is a highly complexed, enigmatic disease that affects nearly 4 million Americans. Surprisingly, over 99% of those affected have sporadic or late-onset AD (SAD), whose causes are unknown. Unfortunately, Alzheimer's disease has no clear cause-and-effect relationship: like unsolved murders, an enormous body of evidence must be collected that can trace steps in order to form hypotheses or to form a consensus in the medical community.

This literature review project focuses on describing recent scientific research into beta-amyloid ($A\beta$) plaques as a potential cause of AD and methods of observing these plaques in the living human brain. Causes of $A\beta$ plaque deposition relate to three factors which medical researchers aim to reverse: overproduction of $A\beta$ protein, a decrease in catabolism of $A\beta$ and/or a decrease in $A\beta$ clearance out of the brain. Potential treatments include cleaving enzyme inhibitors, metal chelation therapy, and chaperone proteins.

Throughout history, scientists and physicians have been unable to view $A\beta$ plaque deposition until after autopsy. Using specialized imaging such as PIB-PET, physicians are now able to observe $A\beta$ plaques in the living human brain. However, PIB-PET imaging also brings about great social and legal consequences: defining who is eligible to receive the test, delineating an appropriate legal and medical plan of action once diagnosis is established, and clarifying who will have access to the results of these tests is only the beginning of the challenges that the health care system and legal system must strive to overcome.

School Violence: Are There Ways to Prevent It?

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Abstract

School violence is reported in the media almost everyday. It occurs mainly at the middle and high school levels and covers a range of violent acts perpetrated by students against other students. Violent acts have run the gamut from bullying all the way to shootings and stabbings. Some of the major causes may include social status among peer relations, economic level of the family and inter-family relationships. Other factors that play a role in the increases in violent acts could include the principal's role, school environment, and discipline. Moreover, it is often not the children who openly show signs of eminent violent behavior who commit these horrendous acts rather it seems to be the quiet, introverted, perhaps neglected child who performs these violent acts. These children are certainly at risk for problems later and need to be spotted early on. Since school violence is on the upswing, ways must be discovered to prevent these violent acts from occurring. One suggestion is a peer-conflict resolution program that could be utilized for this purpose. This program has not been as effective as once thought it would be. Thus, other programs need to be investigated to help resolve this problem.

Self-Esteem, Family Relations and Suicide among College Students

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Abstract

Suicide is the ninth leading cause of death in the U.S. claiming 29,350 lives per year. Suicide rates among youth (ages 15-24) have increased more than 200% in the last fifty years. However, it is higher for the elderly (ages 85+) than for any other age group. Suicide can be prevented, but many people are just unable to see any other alternatives to their problems. It is noted that suicidal people often give various warning, but others are often unaware of the significance of these warnings or unsure of what to do about them. It was once thought that just talking about suicide might cause someone to become suicidal but this has not been found to be the case. Overall, four times more men than woman kill themselves, but three times more woman than men attempt suicide. Firearms are the most common method of suicide among all groups and it cuts across ethnic, economic, social and age boundaries. The greatest impact is on the surviving family members who not only suffer the loss of the loved one to suicide, but are also themselves at higher risk of suicide and emotional problems. In a survey given to college students regarding thoughts of suicide, relationships between low self-esteem and conflicted family relations during childhood were assessed. This investigation addressed some of the numerous reasons that would cause someone to attempt or commit suicide.

Substance Abuse and the Rave Scene

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Abstract

This research study deals with substance abuse in the rave scene. A “Rave” is an all night party, usually featuring electronic music as the primary type of music. Basically, there is an enormous amount of controversy surrounding these parties because of the reputation espoused by the media and some government agencies. According to reports from the mass media, drug use by rave party attendees in previous years was extremely high and the prevalence of individuals taking controlled substances at these parties was overwhelming. This study addressed issues pertaining to the prevalence of drug use during raves and how many individuals truly consume controlled substances while attending these all night parties. These issues need to be addressed so that erroneous beliefs about what actually goes on at a rave can be revealed. The goal of this study was to find out whether the numbers of drug users increased, remained the same, or have decreased in prevalence of substance abuse during rave parties. Surveys were given out to college students. They were asked about rave attendance, drug usage during this time and what effect drug usage had on their rave attendance.

Teenage Pregnancy: *Prevention, Abortion, and Help*

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Abstract

Sexual activity among the teenage population has become the norm rather than the exception. The problem not only concerns individual teenagers but their babies and their families, as well. This project seeks to provide information regarding teen pregnancies and to evaluate programs and policies that could help prevent teenage pregnancy by informing teens of the choices they can make. The importance of education and contraceptive use to prevent teen pregnancy is stressed. Statistics will help place the problem in perspective. For example, each year, almost 1 million teenage women--10% of all women aged 15-19 and 19% of those who have had sexual intercourse--become pregnant. Another 78% of teen pregnancies are unplanned, accounting for about 1/4 of all accidental pregnancies annually. More than half (56%) of the 905,000 teenage pregnancies in 1996 ended in births (2/3 of which were unplanned). Abortion is also touched upon because so many young women resort to this practice. In fact, nearly 4 in 10 teen pregnancies (excluding those ending in miscarriages) are terminated by abortion. There were about 274,000 abortions among teens in 1996. We will present two sides of the abortion issue to illuminate the different points of view in our society. It is evident that an effective method of intervention is necessary and teens should know that help is obtainable from various sources, such as the Internet, Planned Parenthood clinics, and even on telephone hotlines.

The “Silent Killer” and its Accomplices in Lung Cancer

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Abstract

The purpose of this literature review project is to examine some of the causes and molecular mechanisms associated with cancer, particularly lung cancer. Cancer, better known as “the silent killer”, occurs when the growth and differentiation of cells becomes uninhibited and unbalanced. While no two cancers are genetically identical even in the same tissue type, there are relatively few ways in which normal cell growth can be disturbed. One of the most common ways that cancer occurs is by the alteration of a gene, which ultimately stimulates hyperactive cell growth. This altered gene is known as an oncogene. The Ras and p53 genes are two such oncogenes that play a detrimental role in lung cancer due to their ability to control cell growth and response. Lung cancer can occur from a variety of causes ranging from internal factors (such as inherited genes) to external factors (such as the inhalation of chemicals). Investigations into lung cancer have shown a relationship between the amount of cigarettes smoked daily and the subsequent risk of lung cancer. One experiment to test this hypothesis has shown the formation of malignant tumors in the respiratory tract of experimental animals that were exposed to cigarette smoke. Basic research into the function of various genes and carcinogenic factors are underway in order to find new drugs and appropriate therapies for the treatment of lung cancer.

The Effects of Religious Upbringing on the Sexual Behavior of College Students

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Abstract

The purpose of this study is to determine the effects of religious upbringing on the sexual behavior of college students and their willingness to engage in drug or alcohol usage. A comprehensive questionnaire was composed and filled out by a total of fifty students on the main campuses of Nova Southeastern University and Florida Atlantic University. The questionnaire asked a series of questions ranging from age and ethnicity to type of religious upbringing and influence of religious upbringing on the individual's sexual practices. The results of the survey were quantified to either prove or disprove the hypothesis. Analysis of the responses proved the hypothesis inaccurate. The study found that only 'very devout' students, which accounted for ten percent of the participants, responded to not being sexually active or engaging in drug or alcohol use. For those who responded that they were not 'very devout', only a minority of them confessed to neither engaging in sexual activity or drug or alcohol usage. For the majority of students however, their involvement in either one or both of these social behaviors depended greatly on their age and sex. Although religious upbringing did prove to have an effect on the social behaviors of college students; the study more accurately concluded that other factors such as the age and sex of an individual has a more influential bearing on a college student's sexual activity and their willingness to engage in drug or alcohol usage.

The Highly Active-Antiretroviral Therapy (HAART) for Acquired Immune Deficiency Syndrome (AIDS)

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Abstract

The objective of this literature research project is to analyze how the highly active-antiretroviral therapy (HAART) for Acquired Immune Deficiency Disorder (AIDS) has decreased AIDS mortality by interfering with the reproduction of the Human Immunodeficiency Virus (HIV) inside human cells, particularly helper T-cells. Once inside these cells HIV binds to CD4, the membrane protein characteristic of helper T-cells. Then the viral enzyme reverse transcriptase synthesizes a complementary strand of DNA. Once this DNA is incorporated into the cell's genetic material the infected cell synthesizes viral protein. The HAART treatment uses a combination of three drugs (Protease Inhibitors, Nucleoside Reverse Transcriptase Inhibitors and Non-Nucleoside Reverse Transcriptase Inhibitors) to stop this viral reproduction mechanism. A combination of these drugs has proven to be effective in stopping viral replication at multiple sites, thus decreasing the viral load and increasing the CD4 cell count. This project reviews several clinical trials showing that this treatment is more successful in patients who previously were only treated with one class of these drugs. After the introduction of HAART in 1997 this disease that has plagued our society since the 1980s has become chronic and manageable. Although HAART is not the cure, and has multiple side effects, it certainly gives longer, higher quality lives to those infected.

The Living Wage

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Abstract

While the U.S. economy experienced unprecedented growth in income and wealth during the 1990's a significant portion of the working age population did not share in these gains. Specifically, those full time workers earning minimum wage fell behind as any gains in the minimum wage were more than offset by increases in the cost of living. It is not unusual for the family income of minimum wage workers to fall below the poverty level of income. To address this issue many local governments are now evaluating the possibility of requiring vendors who do business with the local government to pay their employees a "living wage".

Miami Dade county officials adopted the "living wage" concept in 1999. It was the first governmental unit in Florida to do so.

The purpose of this research is to evaluate the costs and benefits of this policy on Miami Dade county, its vendors and their employees, and to determine if this is a cost effective method to raise the incomes of the working poor.

The NSU Technology Student Help Site: Ideas to Actions

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Abstract

Technology students at NSU have many resources, but there are none that are made by students, for students. With this project, current technology students pass on their knowledge and research to new students, creating a network of help and support within the student body, not to mention within the University as a whole. The project uses an annotated format to list web sites that were academically relevant and useful for students. These annotations were categorized according to department (Technology), course (such as TECH 4900), and subject divisions within the course. Within these categorizations were listings of web sites that students use in their research that previous student used to proved to be valid sites. The annotation includes the link and title to the particular web site, the rating of the site on a scale from 1-10 (10 being the best), and an objective summary of the site and what it has to offer.

The Wonders Of Mathematica

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Abstract

Mathematica is a powerful software that has the ability to solve small or large scale computations, graph, plot, analyze data, matrices, produced animated movies and much more. Mathematica combines symbolic and numerical calculations into a unified, interactive environment easy to use for students, engineers, scientists and mathematicians. Mathematica is a calculator and a computer algebra software program that uses a high-level programming language. While working through math calculations, a notebook document keeps a report of : inputs, outputs, and graphics in an typeset form. You are able to edit, typeset equations that were entered in the notebook. Mathematica is copyright by Wolfram Research and been around for about 5 years. Wolfram Research still continuous to add new features to the program. Mathematica offers faster speed and lower memory usage for users.

Learning how to evaluate commands are simple and I will demonstrate examples and there steps later. In order to tell mathematica what you want computed, write the equation in the left side area and press Enter on the right side of the keypad. To start a new line of text, just press the Return Key. Any user can create functions by clicking icons and symbols from Tool Palettes. If the integral does not have limits than the answer will be in symbolic form. Yet, if the integral does have limits, the answer will be written as a number.

Basically, mathematica enables every type of operation, such as; data, graphics, functions, programs or documents. Mathematica can be used in every day life because of many reasons. First, the system is easy to learn through the introductory slide shows when Mathematica is started. Second, the outputs or answers from Mathematica are correct, since it has the many different ways to solve problems, which allows for self check. Third, as Mathematica is upgraded it will contain similar versions, therefore you are not required to learn new material. Mathematica give symbolic computations that provide a solution to the problem. You can look at your model, plot it and test it without loss of accuracy.

Treatment of Multiple Sclerosis with oral cannabinoids

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Abstract

Multiple Sclerosis (MS) is an inflammatory disease of the central nervous system (CNS) which includes the brain and spinal cord. Primarily, MS is a disease of the “white matter” tissue. In people affected by MS, patches of damage called plaques or lesions appear in random areas of the CNS white matter. At the site of a lesion, a nerve insulating material, called myelin is lost. Clinically, MS is a difficult condition to characterize because it is unpredictable and variable. Depending on which areas of the CNS are affected and how badly they are damaged, there is a great variety in type and severity of symptoms. The goal of this paper is to review two research articles concerning possible treatment for multiple sclerosis. The first article will evaluate the effect of oral cannabinoids on the immunity to CNS myelin antigens and immune deviations toward T helper cells of MS. The second article will review the symptomatic treatment of muscle spasms, numbness, and pain with the use of oral cannabinoids. It has been found that oral cannibanoids at high doses can act as immune response activators, while at low doses, cannabinoids can act as immunosuppressors. The exact concentrations are presently being studied to determine where the cut off exists between doses in immunosuppression and immune system activation. Also, patients treated with the cannabis extract ⁹-THC had reduced muscle spasms, more mobility, and reduced pain.

Using genetic sampling of hair to confirm origin and identify Florida Panthers

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Abstract

This project investigates the origin of a puma currently living in a zoo in Ecuador. Although this particular puma (named Sasha) is assumed to be of South American origin there is some speculation that she was brought to South America from Florida in the early 1980s. In order to determine Sasha's most likely geographical origin and subspecies, DNA was extracted from hair from three known Florida panthers as well as from one of Sasha's cubs. The target gene for this research is the mitochondrial NADH-5 (ND5) gene that is passed on from the maternal parent. Several variations (haplotypes) in this gene have previously been shown to be indicative of the different puma subspecies, which reflect geographical range. Following extraction and isolation of the DNA, primers for the mitochondrial ND5 gene were added and polymerase chain reaction (PCR) was performed in order to isolate this specific ND5 gene and amplify it. The PCR products were then run on a gel to confirm that the isolated section of DNA was 328 base pairs, the size of the ND5 gene. The restriction enzyme BsmI was then added to the gene. This restriction enzyme targets a single nucleotide difference between the North American and South American haplotype by cutting the ND5 gene into two similarly sized fragments and leaving the ND5 gene from the South American puma subspecies uncut. The differences in nucleotide sequence among puma subspecies (haplotypes) can also be investigated by sequencing the ND5 gene isolated from the different puma individuals.

Using an optimization method to determine the parameters of the accommodative system of the eye

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Abstract

Abnormal binocular vision occurs in a broad range of disorders including strabismus, amblyopia, heterophorias, large fixation disparities, and anomalous refractive conditions. The examination and treatment of these problems are the major tasks in optometry clinics. However, the concepts and parameters used in clinic are not closely related to the parameters in the interactive model of the accommodative and vergence systems (Hung and Semmlow, 1980; Jinag, 1997). In this study, we used a mathematical optimization method (Zheng, et al., 1978) to determine these parameters for patients with normal and abnormal binocular vision and compare the results in the estimated parameters to identify the difference between the patients.

Why northern mockingbirds (*Mimus polyglottos*) face the sun: an evaluation of Thermoregulation and countershading explanations using orientation during overcast conditions

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Abstract

When the sun is near the horizon, Northern Mockingbirds (*Mimus polyglottos*) show a strong tendency to orient their lighter-colored ventral surfaces toward the sun. It is unclear whether the function of this orientation is visual conspicuousness, thermoregulation, or regulation of exposure to ultraviolet radiation. However, all three of these potential functions would not apply when sunlight is blocked by dense cloud cover. Thus, mockingbird orientation during overcast conditions should be random. To test this prediction, 50 mockingbirds were found during overcast but otherwise calm conditions and the compass orientations of their ventra were recorded. Compass orientations were strongly directional and associated with the sun's azimuth. Overall, mockingbirds appeared to direct their ventra toward the sun under both cloudy and clear skies, but the tendency is much weaker under cloudy skies. Polarization in exposed patches of skylight could be the relevant cues for orientation during overcast conditions. Mockingbirds may have been reinforced for orienting their ventra with respect to the sun and sky polarization. This reinforced orientation may be generalizing to overcast conditions and other contexts in which some orientation cues are present. The benefits derived from this behavior remain unclear.