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The College of Arts & Sciences

Presents

SEASTARS 2007



UWF Conference Center
April 19, 2007
1:00 p.m. to 4:00 p.m.

Academic Department
Advisory Committee Members:

- Biology, Dr. Phillip Ryals
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- Nursing, Ms. Susan Harrell
- Physics, Dr. Laszlo Ujj
- Psychology, Dr. Vicki Gier

Dr. Venkat Sharma, Coordinator
Administrative Fellow, CAS Dean's Office

2006 Award Winners

President's Award:

Ms. Rebecca Paschen

College of Arts & Science Dean's Award:

Ms. Heather McGee
Dr. Claudia Stanny
Dr. James Arruda
Dr. Hongmei Zhang

SEASTARS

Scholars of Engineering, Applied Sciences & Technology Annual Research Symposium

The College of Arts & Sciences (CAS) is dedicated to the promotion of student and faculty research, scholarship, and creative activity as a vital component in the curriculum at the University of West Florida. Higher education in science, technology, engineering and mathematics has long been recognized to benefit from research-rich environments and inquiry-based learning. Through the continuation of this annual conference, the goal of the CAS is to create a forum for the communication, celebration and promotion of scientific knowledge.

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1) A Method for Enhanced Isolation of Peripheral Blood Mononuclear Cells

Ms. Madlin Alzoubi, Mr. JimSeup Lim, Ms. Angelina Sansone, Mr. Yi Chun Huang, Dr. Venkat Sharma

Department of Biology



Peripheral Blood Mononuclear Cells (PBMC) comprise the basis of a number of studies done in our laboratory. PBMC are typically isolated from whole blood by centrifugation and phase separators. These methods limit the yield of PBMC. New research suggests the use of filters that are employed in blood banks prior to transfusion to increase the number of PBMC isolated. These filters have been shown to isolate over 99% of the PBMC. The PBMC isolated will provide us with a pure sample for further isolation of a specific type of B-cells, called CD-19 Cells. These CD-19 Cells are the leading source of cells in our studies to understand AIDS-associated B-Cell malignances. Furthermore, these purified CD-19 B-Cells help to investigate the role of retro-viral proteins in modulating several B-Cell cytokine genes. Modulations in B-Cell cytokine genes partially explain the molecular mechanism of cytokine involvement in AIDS related B-Cell lymphomas. Understanding the mechanism(s) of cytokine regulation will pave way for novel drug development against AIDS-associated B-cell lymphomas.

54) Psychosocial, Metacognitive, and Performance Related Correlates of Presentation Anxiety in University Students

Ms. Mary Storts, Dr. Melanie Pelton

Department of Psychology



There are several factors that may contribute to public speaking anxiety. However, few researchers have investigated the differences between different public speaking situations and anxiety. The present study focused on one of the most common anxiety producing public speaking situations, classroom presentations (presentation anxiety). Specifically, we examined what factors distinguish presentation anxiety from public speaking anxiety. Ninety-seven college students completed a battery of self-report measures, assessing the following: public speaking anxiety, social support, self-talk, self-efficacy, test anxiety, and presentation anxiety. A Pearson product-moment correlation was used to measure the correlation between all variables. Correlations were compared to $\pm = .05$. The analysis revealed that presentation anxiety and public speaking anxiety were correlated. The results show that public speaking anxiety and presentation anxiety are not the same phenomenon. Furthermore, the results suggest that there are multiple, unique factors for presentation anxiety. According to the findings, test anxiety is one factor that distinguishes presentation anxiety from public speaking anxiety. In addition, the finding that lower levels of family support are unique to presentation anxiety and higher levels of negative self-talk are present in presentation anxiety help to further demonstrate the distinction between presentation anxiety and public speaking anxiety.

53) Community Attitudes Towards HIV/AIDS and Homosexuality

Ms. Kimberly Sinkkanen, Ms. Paula Orlosky, Ms. Heather Rhoden,
Dr. Sam Mathews, Dr. Susan Walch
Department of Psychology



Little is known about variations in attitudes towards HIV/AIDS and homosexuality as a function of age, gender, race, education level, religion, political party, and personal knowledge of homosexuals or persons with HIV/AIDS. A convenience sample of 464 participants was recruited from area retail centers in Northwest Florida. Results revealed that males, Baptists and individuals who haven't known someone with HIV/AIDS or someone who is homosexual scored significantly higher than their counterparts on homophobia and fear of AIDS. Republicans scored higher on homophobia but not fear of AIDS. Older age was related to greater homophobia and fear of AIDS; greater education was related to lower homophobia and fear of AIDS.

2) The Influence of Presenilin's Molecular Structure in the Formation of an Active Gamma-Secretase

Ms. Ala Barakat, Dr. Hui-Min Chung
Department of Biology



Cell-cell communication is responsible for cell growth, differentiation, and morphogenesis in multi-cellular organisms. One of the important mechanisms responsible for cell communication is the Notch signaling pathway, of which Notch receptor is the central player. To become functional, Notch protein is cleaved by a protease called g-secretase. In addition to Notch, g-secretase also mediates cleavages of a variety of proteins such as beta-amyloid precursor protein (APP), and adhesion molecules including E-cadherin and N-cadherin. Defects of Notch, APP and cadherin proteins are associated with occurrence of human diseases. The components of g-secretase complex include: Nicastrin, Aph-1, Pen-2, and Presenilin (Psn); these components are highly conserved among animal species. Therefore, the understanding of human g-secretase can be achieved by studying the counterpart of g-secretase in the fruit fly, *Drosophila melanogaster*. This study employed fly genetics to determine the functional domains of Presenilin proteins in *Drosophila*. We use various forms of Presenilin to study the functional domains of Presenilin in mediating g-secretase activity through biochemical analysis and genetic studies.

3) Metabolic and Tolerance Capacity Adaptations of Two Fiddler Crab Species from Different Habitats in Northeast Florida

Ms. Sandra Barszczewski, Dr. Wayne Bennett

Department of Biology



The Sand fiddler crab *Uca pugilator*, and the red-jointed fiddler crab *Uca minax* have sympatric distributions across much of their range, but prefer very different habitat types. In northwest Florida the sand fiddler can be found associated with sandy environments near quiet bays and salt marshes, whereas, the red-jointed fiddler inhabits muddy estuary habitats of low salinity. While these two habitat types may be found in close proximity to one another, the abiotic conditions of each differ markedly. Estuary habitats preferred by the red-jointed fiddler are typically anoxic, shaded and relatively cool. Conversely, sand fiddler crabs dig burrows that remain well-oxygenated at low tide, but because they are exposed, endure harsh temperature spikes during summer. Different habitat requirements suggest that these species will exhibit different physiological adaptations for dealing with environmental conditions. This project examines metabolic rates, low oxygen tolerance and dynamic high temperature tolerance of each species acclimated to winter and summer conditions. Data collection will begin as soon as field temperatures increase and crabs emerge from winter brumation.

52) Measuring Reliability and Validity: Stage of Change for Reducing a Woman's Vulnerability to Sexual Assault

Ms. Paula Orlosky, Dr. Susan Walch

Department of Psychology



The Stage of Change Date and Acquaintance Rape Vulnerability Scale (SOCDARVS) is a new scale measuring women's vulnerability to sexual assault based on the Stage of Change model. Examination of the scale's psychometric properties showed adequate internal consistency and that a three-factor structure accounts for much of the scale's variance. Validity of the SOCDARVS was supported through correlations with other standardized measures.

51) The Effects of Text Difficulty and Pre-existing Highlighting on Participant's Judgment of Learning, and Reading Comprehension

Ms. Amelia Nanez-Gonzales, Ms. Erica House, Dr. Vicki S. Gier
Department of Psychology



The purpose of the proposed study was to determine whether text difficulty, hard versus easy, and highlighting, inappropriate, appropriate, or no highlighting, had an effect on reading comprehension. One-hundred eighty undergraduates were recruited to participate in this study. The participants were divided into two test conditions: Hard version versus Revised version and each of those two groups were randomly divided into three groups: Inappropriate Highlighting, Appropriate Highlighting or No highlighting. The participants reported their Judgment of Learning for each passage s. The hypothesis was that the participants in the Hard text condition with inappropriate highlighting would score lower on a reading comprehension test than those in the Easy condition with appropriate highlighting. The results will be used as a pilot for an extended version of this study.

4) Hypoxia Tolerance and Resistance of Two Species of Fiddler Crabs, *Uca minax* and *Uca pugilator*

Dr. Wayne Bennett, Ms. Laura Enzor, Ms. Alexandria Marsh, Mr. Kevin Mayes, Ms. Kimberly Goebel, Mr. Forrest (Alexander) Vail
Department of Biology



This study examines tolerance of hypoxia and resistance to hypoxia in two species of fiddler crabs, *Uca minax* and *Uca pugilator*. In order to test tolerance of hypoxia, crabs were run in a closed respirometry system in 250 mL Erlenmeyer flasks. Nitrogen was bubbled through the system at a constant flow rate for 45 minutes to decrease the amount of oxygen in the system. After 45 minutes the flasks were pinched off and crabs were allowed to strip the remaining oxygen out of the flask via respiration. When each crab exhibited loss of righting response (LRR) a water sample was taken from its flask and a Winkler titration performed to determine the amount of dissolved oxygen remaining in the flask water. Hypoxia resistance was evaluated by placing crabs in an open respiratory system in 250mL Erlenmeyer flasks. Nitrogen was bubbled through the system at flow rates of 0.25, 0.50, 0.75 and 1.0 liters per minute. Crabs were observed until LRR was noted. At this point, hemolymph was drawn from each crab and lactic acid tests were performed in order to determine the amount of lactic acid accumulated during the trial.

5) Intracellular Calcium Release is Stimulated in *Tetrahymena vorax* by the Macrostomal Cell-Inducing Ligand, Stomatin

Mr. Reynald Damaso, Ms. Jessica Jones, Ms. Christina Steinmetz, Dr. Phillip Ryals

Department of Biology



The effect of stomatin on intracellular calcium concentration in *Tetrahymena vorax* was examined using fluorescence spectroscopy of the cell permeable calcium probe Calcium Orange/AM. Intracellular calcium concentration began to increase three to four minutes following stomatin addition to cells and continued to rise for at least 20 min. 2-Aminoethyl diphenylborinate, a modulator of the inositol trisphosphate receptor/calcium channel, blocked stomatin-induced calcium release at a concentration of 100 μM . Calcium release was temporally consistent with an earlier finding by this laboratory that intracellular inositol trisphosphate concentration rises approximately two min following stomatin addition to cells. Western blot analysis of an endoplasmic reticulum-enriched protein fraction from *T. vorax* revealed a single band having cross reactivity with a polyclonal antibody against mammalian type I inositol trisphosphate receptor. These findings provide evidence for a calcium release step in the signaling cascade responsible for inducing macrostomal phenotype formation in polymorphic species of *Tetrahymena*. Supported in part by a Merck-AAAS Undergraduate Research Program Grant and a Scholarly and Creative Activities Award from the University of West Florida.

50) Effects of a Complex Enrichment Device on Tool Use, Tool Manufacturing, Activity Budgets, and Stereotypic Behaviors in Captive Western Lowland Gorillas (*Gorilla gorilla gorilla*)

Ms. Kiersten Jarvis, Dr. Sam Mathews

Department of Psychology



Captivity may be responsible for abnormal behaviors that arise in captive populations of animals. As a way to reduce abnormal behaviors produced by two captive male gorillas at The ZOO Northwest Florida, a complex enrichment device that provided favored food contingent on the gorillas ability to use tools was incorporated into their environment. Each of the two male gorillas, Babuka and Mwelu, was observed for a period of 10 weeks, with observations taking place twice each week for approximately 30 min each. Activity levels significantly increased after implementation of enrichment for both gorillas. Abnormal behavior significantly decreased after implementation of enrichment for Babuka but did not reach significance for Mwelu. Successful tool using and tool manufacturing was observed for Babuka but not for Mwelu.

49) The Effects of Background Music on Reading Comprehension and Retention

Ms. Erica House, Ruth Esser, Wanda Carranza, Dr. Vicki Gier
Department of Psychology



This study will examine the effects of background music on students' reading comprehension and retention abilities. To measure the effects, we took two reading passages obtained from a GRE study guide as well as 10 questions corresponding to those articles to have the participants read while music was either present or absent, and then complete a short test. The participants were divided into three groups: a control group which will listen to no background noise, a second group which will listen to classical music while reading and testing, and a third group which will listen to nature sounds while reading and testing. Our hypothesis was that those participants in the two groups with background music or nature sounds will achieve higher scores on their tests versus the participants in the control group.

6) Effects of Salinity on Thermal Tolerance of Atlantic Stingray, *Dasyatis sabina*

Ms. Wendy Eash, Dr. Wayne Bennett
Department of Biology



Atlantic stingrays, *Dasyatis sabina*, are euryhaline elasmobranchs common to shallow waters along the Gulf of Mexico and the Atlantic coast. Atlantic stingrays use Trimethylamine Oxide (TMAO) to offset harmful effects of high plasma urea concentrations used by all elasmobranchs to help reduce the osmotic gap between body fluids and seawater. The stabilizing effect of TMAO concentrations may also cause a shift in thermal tolerance in cases where fish have been acclimated to high salinities. Both critical thermal tolerance minimum (CT_{min}) and critical thermal tolerance maximum (CT_{max}) of Atlantic stingrays acclimated to selected salinities between 5-650 were tested. Preliminary data indicate that TMAO values increase with salinity. Respective CT_{min} values also show a significant increase; however, no differences were apparent in CT_{max}. When completed, the experiment will provide a better understanding of the effects of TMAO and salinity on the thermal tolerance of the Atlantic Stingray.

7) The Spine of Atlantic Stingray (*Dasyatis sabina*): Venom Toxicity and Metabolic Costs

Ms. Laura Enzor , Dr. Wayne Bennett

Department of Biology



Atlantic stingray, *Dasyatis sabina*, possess a venomous spine located at the anterior base of the tail. The spine itself is bilaterally serrated with two ventrolateral grooves where venomous tissue is housed. While studies performed during the 1950's-1970's have examined the toxicity of stingray venom on various rodents, amphibians and mammals, the toxic effects of stingray venom on a fish species have never been considered. This project will determine the toxicity of Atlantic stingray venom by establishing the level of toxin lethal to 50% (LL50) of a target fish species (Sheepshead minnow, *Cyprinodon variegates*). Potential differences in toxicity between male and female venoms as well as quantify the oxygen uptake and caloric density of the venomous spine in order to estimate metabolic demands of producing the spine and tissues will be investigated. The research will also evaluate the possibility of the spine existing for a purpose other than defense. Many of the Atlantic stingray's natural predators are found with spines imbedded in their jaws and body cavities. Evaluating both the toxicity and metabolic aspects of the spine may help determine if defense is indeed the primary purpose of the spine.

48) The Effects of Positive and Negative Words on the Empathy Levels of College Students

Ms. Jennifer Gisel, Ms. Shannon Van Heest, Dr. Vicki Gier

Department of Psychology



The purpose of this study was to determine whether using priming words, positive, negative, or neutral, would have an effect on the ability of college students to determine the bully when presented with a peer victimization scenario. Undergraduate students from the University of West Florida were randomly divided into three groups: Positive words, Negative words, or Neutral words. The words were presented before a segment of the movie entitled Mean Girls. The movie segment contained ambiguous messages of peer victimization. Additionally, the chosen segment did not contain any violence. Upon completion, each group completed the post-survey which tests for the ability to identify the "bully." Data collected from the surveys were analyzed using quantitative measures for any statistical differences between the three groups.

47) The CSI Effect: What Students Think They Know About Forensic Psychology

Teaetta Gilbert, Alyinth Bowen, Jennifer Grainger, Dr. Vicki Gier
Department of Psychology



Forensic psychology involves applying psychology to the field of criminal investigation and the law. The popularity of forensic psychology has grown phenomenally in recent years, partly due to sensationalized portrayals of the field in movies and television—referred to as the CSI Effect, which are not always accurate. Forensic psychologists are often depicted as criminal profilers who are able to almost psychically deduce a killer's next move. In reality, these professionals practice psychology as a science within the criminal justice system and civil courts. The purpose of this study is to determine what undergraduates think they know about Forensic Psychology versus what they actually know about Forensic Psychology. Approximately 100 undergraduates will be recruited for this study. The participants will be asked to fill out a survey asking them questions what Forensic Psychologists do, what degrees they have, their average salaries, and how often they watch shows such as: CSI, Criminal Minds, and Law and Order. Our hypothesis is that students will think they know more than they actually know about the field of Forensic Psychology

8) Effect of Salinity on Urea and TMAO Levels in Blood Plasma of Atlantic Stingray, *Dasyatis sabina*

Ms. Erin Ferer, Dr. Wayne Bennett
Department of Biology



Atlantic stingrays tolerate salinities of 00 in Lake Jessup, Florida to 700 in Laguna Madre, Texas. Like most elasmobranchs, Atlantic stingrays regulate plasma urea levels to reduce the osmotic gap and trimethylamine oxide (TMAO) to ameliorate urea's deleterious effect on proteins. While studies have investigated osmotic responses to decreasing salinities, little is known of how urea and TMAO levels change over increased salinities. This project examined changes in plasma urea and TMAO levels of Atlantic stingrays exposed to salinities of ranging from 5-650. Plasma osmolality at 350 seawater showed a 33% difference from water osmolality. At 50, stingrays became hypersaline showing a 440% increase between plasma and water osmolality. Atlantic stingrays maintained plasma osmolality slightly higher than water with a 4% difference at 500. Mean urea and TMAO values showed significant changes between salinity treatment groups ($P < 0.05$). Urea:TMAO ratios remained relatively constant at approximately 10:1 showing no significant difference ($P < 0.05$) between treatment salinities, suggesting that compounds other than TMAO make up the remaining osmotic gap. Regulating and maintaining consistent osmolyte:urea levels at high salinity is the key adaptation making Atlantic stingrays one of the most euryhaline elasmobranch species known.

9) Pulmonary versus Extrapulmonary Oxygen Uptake in Three Species of Highly Aquatic Turtle: *Trachemys scripta*, *Sternotherus minor*, and *Apalone ferox*

Mr. Steven Garner, Dr. Wayne Bennett

Department of Biology



Aquatic turtles extend submergence times through passive diffusion across cutaneous surfaces and ventilation of orifices such as the buccopharynx and the cloacal bursae. Although all three potential avenues for aquatic oxygen uptake have been frequently studied, the extent to which individual species utilize these tactics while submerged is not sufficiently documented. Pulmonary and extrapulmonary oxygen uptake at active temperatures were measured in three species of aquatic turtle, *Trachemys scripta*, *Sternotherus minor*, and *Apalone ferox* to determine the contributions of atmospheric and aquatic oxygen uptake to total oxygen uptake. Extraction levels were not significantly different across all species; however, each species did utilize extrapulmonary avenues to varying degrees. Extrapulmonary oxygen uptake comprised 23, 19, and 18% of total oxygen uptake in *A. ferox*, *T. scripta*, and in *S. minor*, respectively. *Sternotherus minor's* total oxygen uptake (highest recorded total) was 1.86 mL hr⁻¹, three times higher than *T. scripta* (lowest recorded total) at 0.65 mL hr⁻¹. *A. ferox* was intermediate of the other two species with a total oxygen uptake of 1.45 mL hr⁻¹.

46) The Effect of Aromatic Essential Oils on Human Emotional Reactions While Watching a Violent Video Clip

Ms. Desiree Calitri, Mr. Jared Cruz, Ms. Leah Henry, Ms. Kate Robinette, Dr. James Arruda

Department of Psychology



The purpose of this study is to determine the effects of inhaled essential oils of lavender and peppermint on the human emotional reaction to a violent video. The participants will be randomly assigned to one of three groups: lavender, peppermint, or no scent. The participants will be exposed to the scents while watching the violent video. The participants will then be asked to respond to questions on a questionnaire regarding their emotional reactions to the violent video. The results will potentially promote further research on the possible applications of this research in entertainment, communication, and psychological therapy.

45) Do Adults Have Better/Worse Recall of other Adult's Faces Versus Children's Faces?

Ms. Corazon Burke, Ms. Andrea Underwood, Ms. Kimberly Lauterbach, Dr. Vicki Gier

Department of Psychology



The purpose of this study was to determine whether undergraduates recognize other adult faces easier than children's faces. Over 30 participants were recruited for this study. The participants first viewed a PowerPoint slide of 40 pictures of adult and children's pictures. After viewing the pictures for 2000ms the participants were then administered a distracter task. Following the 5 minute distracter task the participants then viewed 20 pictures of both children and adults for 15 seconds. The participants responded that the picture they were viewing was "New" in that they have not seen this face before or "Old" in that they had seen the face in the first PowerPoint presentation. In addition, the participants rated how confident they were in their responses. This study is the first study of a series of three studies that will be conducted on face recognition.

10) Use of Stable Isotope Analysis to Infer Trophic Position, Ontogenetic Shifts in Diet, and Competition Between the Pinfish (*Lagodon rhomboides*) and Associated Estuarine Dependent Seagrass Fishes

Mr. Steven Garner, Dr. Will Patterson

Department of Biology



Estuarine primary producers are enriched in $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ relative to marine primary producers, therefore, shifts in sources of production during larval and juvenile recruitment from spawning grounds offshore to inshore nursery habitat can be tracked using isotopic analysis. Muscle tissue samples of estuarine dependent fishes were analyzed by EA-IRMS to determine trophic structure, food web connectivity, and estimate sources of production utilized by juveniles recruiting to estuaries. Pinfish and silversides showed no ontogenetic shift in trophic level with size increase, however, spot showed a linear trophic increase with size. Intermediate isotopic values displayed by pinfish, silverside, and spot suggest possible competition between these species, however the spot appear to rapidly switch to higher trophic level prey as they grow, where as pinfish and silverside continue to exploit similar trophic resources in larger size classes. Striped killifish and striped mullet do not display interspecific competition, likely exploiting resources distinctly different from other fishes.

11) Leaf-Epiphytic Pseudomonads as Sentinel Indicators of Disease and Stress in Cotton (*Gossypium* spp.)

Ms. Kristen Hellein, Dr. Joe Lepo, Ms. Lori L. Phillips

Department of Biology



Agroterrorism is “the deliberate introduction of a chemical or disease agent either against livestock/crops or into the food chain, for the purpose of undermining stability and/or generating fear” (Florida Department of Agriculture and Consumer Services). Successful acts of crop agroterrorism would affect the economic and social stability of the U. S. This research provides a base from which sentinel diagnostics for crop agroterrorism may be developed. Communities of bacteria within order *Pseudomonadales* and genus *Pseudomonas* (informally known as pseudomonads) are being monitored because of their ubiquity and dominance on leaf surfaces. Shifts in the total load of epiphytic pseudomonads and in their community structure, precipitated by invasion of a pathogen or by other plant stressors, may be sentinel to crop agroterrorism. Microbial-, physical- and chemical-stressors to cotton plants under controlled conditions are being monitored. Using molecular DNA technologies known as qPCR, T-RFLP and ARISA, the bacterial load, and the diversity and richness of pseudomonads on cotton leaves will be assessed. In addition, Elucidation of signature patterns of epiphytic pseudomonad communities signature patterns that correlate with specific stressors is planned. Such changes will likely support their use as diagnostics for plant stress or disease before any symptoms appear.

44) Examining Associations Among Psychosocial Variables for Emerging Adult Interpersonal Functioning

Ms. Elisabeth Brennan, Dr. Millie Cordaro, Ms. Liz Holloway, Ms. Erica House, Ms. Amelia Nanez-Gonzalez, Ms. Stephanie Strait, Ms. Shannon Van Heest,

Department of Psychology



The purpose of this study was to investigate associations between psychosocial variables among emerging adults. Developmental characteristics of emerging adulthood include strengthening psychological autonomy and emotional independence through intra- and interpersonal functioning. These characteristics and were investigated using the following psychosocial variables: relational efficacy, general self-efficacy, emotional intelligence, and life satisfaction. There were 120 participants surveyed from upper division, psychology courses. Psychosocial variables demonstrated significant correlations. Emerging adult scores of general self-efficacy, relational efficacy, and emotional intelligence demonstrated moderate, positive correlations, and low to moderate positive correlations with life satisfaction. The findings contribute to an understudied body of literature on emerging adulthood and can assist university personnel working with students.

43) The Effects of Auditory Distractions on Cognitive Functioning

Ms. Jennifer Amigh, Ms. Matilda Kirkland, Ms. Tiffany Parker,
Dr. Ron Belter, Dr. Steve Vodanovich
Department of Psychology



The purpose of this study is to determine the effects of distractions on puzzle solving performance. At least 30 students from the University of West Florida will be recruited to participate in this study. Each student will be issued a crossword puzzle of medium-level difficulty for them to complete under three different conditions. While the students are completing the first puzzle, several verbal distracters will be presented by the researchers directed toward the participants. Next we will distract them once again with the sound of conversation among the researchers. The final puzzle will be completed with no distractions from the researchers. Then the students will complete a Likert scale to measure their mood; one being the most frustrated with the puzzle, and five being pleased with the puzzle and their performance.

12) The Role of Trimethylamine Oxide in Determining Temperature Tolerance Limits in the Eurythermic Bamboo Shark

Ms. Amanda Herald, Dr. Wayne Bennett
Department of Biology



To preserve osmotic homeostasis in seawater, the spotted bamboo shark, *Chiloscyllium punctatum* maintains high levels of urea and trimethylamine oxide (TMAO) in its body tissues. The light-weight osmolyte (TMAO) mitigates the deleterious effects of urea on enzymes by restoring their functional shape. TMAO is typically high in bamboo sharks and studies have shown that the osmolyte may stabilize enzymes under high temperature conditions as well. This study looks at the effect of higher temperatures on TMAO levels. The hypothesis is tested by measuring TMAO concentrations in conjunction with thermal tolerance. One shark is currently acclimated at 83°F while waiting on several more to be delivered in late summer; therefore, it is difficult to estimate the time period in which the research will be completed and the results can be discussed in full.

13) Understanding the Interaction of Filamin and Presenilin

Mr. Chris Kay, Dr. Hui-Min Chung

Department of Biology



The common fruit fly *Drosophila melanogaster* is estimated to share nearly half its genome with that of humans. Roughly three-fourths of known human disease genes are mirrored in fruit fly sequences, and more than 50% of *Drosophila* protein sequences have mammalian analogues. Filamin and Presenilin are two such proteins common to humans and *Drosophila*. Filamin has long been identified as a key factor in cytoskeletal organization via functional interaction with actin filaments. Presenilin was first implicated in early-onset familial Alzheimer's disease (FAD); studies have identified Presenilin as a functional subunit of the gamma-secretase complex, whose normal function is impaired by FAD-linked Presenilin mutations. Both Filamin and Presenilin have also been associated in cell signaling pathways, suggesting broader roles in cell communication and tissue morphogenesis. Recent finding of physical interaction between these two protein classes raises questions as to their functional relationship, with possible implications for pathogenesis and treatment of Alzheimer's disease. The nature of this interaction has not yet been determined. This study aims to identify the structural and functional relationship of Filamin to Presenilin by comparison of wild-type, single-mutant, and double-mutant phenotypes, respective protein localizations, and *in vitro* analysis of binding between mutant Filamin and Presenilin forms.

42) Temperature Dependent Infrared Absorption Spectrum of Mono-Molecular Layer Deposits of 4-octyl-4-biphenylcarbonitrile (8CB)

Mr. Tyler Reese, Mr. Bart Clark, Mr. Chris Clanton, Mr. Gary L. Johns, Mr. Aaron Williams, Mr. Casey Jones, Mr. Charles Amos, Mr. Danielle Mallernee, Mr. Eric Clemons, Dr. Timothy Royappa, Dr. Pamela Vaughan

Department of Physics & Chemistry



In this experiment we have developed a process for observing the infrared (IR) absorption spectrum of Langmuir-Blodgett liquid crystal films over a controlled temperature range. The resulting sequence of spectra allows for analysis of how the domain structure of the ultra-thin liquid crystal film changes with temperature. Mono-molecular layers of the liquid crystal 8CB were deposited on quartz slides using a Langmuir-Blodgett trough. The quartz slides were gold-coated in a vacuum coater to reflect IR rays. A special sample holder was designed and constructed to maximize the IR signal by double-passing the beam through the sample. The path of the IR beam was controlled with gold-coated mirrors mounted in the sample holder. The entire sample holder was designed to fit in the sample holder of a Perkin-Elmer transmission FT-IR spectroscope. A peltier junction based temperature controller was constructed to vary the temperature of the sample. With this arrangement, IR spectra of the ultra-thin films could be recorded at different temperatures. The procedure and setup that have been developed for this experiment can be used to study any mono-molecular material. The details of this process will be discussed in our presentation.

41) Investigations of Coherent Anti-Stokes Raman Spectroscopy

Mr. Josh Olitzky, Mr. Chris Clanton, Dr. Laszlo Ujj

Department of Physics



This research activity involves the assembly of a CARS system, allowing the reproducible measurement of the vibrational spectra of materials. Coherent Anti-Stokes Raman Scattering, (referred to as CARS), is a non-linear optical process that is the coherent version of Raman Scattering. A Nd:YAG laser system which has the capability of frequency doubling and tripling generates a 10ns (nanosecond) pulse train of light at 532nm and 355nm wavelengths. We generate a broadband laser beam with an OPO (Optical Parametric Oscillator) driven by the 355nm optical output from the Nd:YAG laser. By interacting the 532nm beam and OPO broadband beam in a condensed phase sample, a signal output beam is created. The frequency spectrum of this coherent output is specific to the material where the interaction occurs. The interaction previously described between the two input beams causes an excitation of discrete allowed vibrational levels of the molecule. The vibrational spectra are obtained using a monochromator and photomultiplier tube. The spectra are recorded and analyzed using computer software.

14) IL-19 Expression in AIDS Associated B-cell Lines

Mr. JinSeup Lim, Ms. Angelina Sansone, Ms. Madlin Alzoubi, Mr. Yi Chun Huang, Dr. Venkat Sharma

Department of Biology



Cytokines are small proteins essential in intercellular signaling. Interleukin-19 (IL-19) is a cytokine that belongs to the IL-10 family. In order to determine the relationship between IL-19 and B-cell lymphoma in AIDS, the expression of IL-19 in AIDS associated B-cell lines (AABCL) and non-AABCL was studied. 13 different B-cell lines were cultured in RPMI 1640 Media at 5% CO₂ and 37°C in a humidified incubator. Cells, both control and PMA (tumor promoter) stimulated, were incubated at varying times and cells harvested. RNA was isolated from each sample and was analyzed for IL-19 gene expression using Reverse Transcriptase-Polymerase Chain Reaction (RT-PCR). All gene modulations were normalized to the GAPDH house-keeping gene for semi-quantitation. The RT-PCR products after electrophoresis were viewed using VersaDoc™ Model 4000 Imaging System. It was observed that IL-19 was expressed predominantly in AABCL. However, expression levels of IL-19 in non-AABCL that were also Epstein Barr Virus (EBV) negative were not observed. However, when an EBV superinfected cell line, B958, was used IL-19 transcripts were observed. These results suggest that IL-19 expression requires synergistic interactions with both EBV and HIV to induce B-cell lymphomas consistent with our working hypothesis.

15) Comparison of Metabolic Demands of Pregnant and Non-pregnant Pipefishes from a Temperate Seagrass Environment

Ms. Ashley O'Farrell, Dr. Wayne Bennett

Department of Biology



Scientists are still debating whether or not male pipefish provide nutrients to the developing embryos within their brood pouches. Conclusive evidence for or against the hypothesis has not been obtainable by current research. In addition, metabolic demands have not been compared between pregnant and non-pregnant pipefishes. The objectives of this experiment were to (1) determine if pregnant males have a higher metabolic demand than non-pregnant males and females within a single species and (2) to compare the metabolic demands between two species of pipefish. Two species of pipefish, *Syngnathus scovelli* and *Syngnathus louisianae*, were collected from seagrass beds along Pensacola Bay, Pensacola, FL. Flow-through respirometry and Winkler titrations were performed on the fish to determine their metabolic demands, and data were analyzed by Analysis of Variance and Tukey's Multiple Range Test. Data, results, and discussion are pending.

40) Preparation and Optical Characterization of Ultra Thin Films of Cholesterol in Eicosanoic Acid

Mr. Charles Amos, Mr. Bart Clark, Mr. Daniel Mallernee, Mr. Tyler Reese, Mr. Gary L. Johns, Dr. Timothy Royappa, Dr. Pamela Vaughan

Department of Physics & Chemistry



This presentation describes the preparation of ultra thin films of cholesterol in eicosanoic acid and their optical characterization using polarized light. The films are prepared from solutions in chloroform and made with different concentrations of cholesterol. Eicosanoic acid is known to yield good ultra thin films and is therefore used as a backbone for the cholesterol molecules. The films are created using the Langmuir-Blodgett technique, which allows the film to be spread onto the surface of ultra pure water and then deposited on a substrate of glass or quartz. Since both cholesterol and eicosanoic acid have hydrophilic and hydrophobic ends, they have the tendency to align themselves in the same direction when introduced to the gas liquid interface at the surface of water. The films are prepared as single monomolecular layers or as multilayers. Optical properties of the films are studied using transmitted and reflected polarized light.

39) Observing the young child's compliance using progressive charts and stickers as incentives while measuring nurses' responses in relation to the intervention

Ms. Lydia Civelli, Mrs. Laurel Boyd

Department of Nursing



Hospitalized children, specifically the children ages three to seven years old, have minimal understanding of their illness and treatment. Out of fear, young children will frequently resist and impede the nurse's assessments and treatments. Their resistance increases the nurse's effort to gain compliance and this creates a stressful environment for both the child and the nurse. Therefore, to reduce the added strain upon the nurses this study plans to investigate the effects of rewards and positive reinforcement with children. The subjects included are young children, ages three to seven-years-old at Sacred Heart Hospital. The procedure entails the assigned nurse to offer stickers for compliance and further reinforces the subject's behavior with praise. It is anticipated that the stickers and positive reinforcements will lead to enhanced cooperation, moreover easing the efforts of the nurses.

16) Effect of Camptothecin on Interleukin-16 Expression in Peripheral Blood Mononuclear Cells

Ms. Angelina Sansone, Ms. Christine Marking, Mr. JinSeup Lim, Ms. Madlin Alzoubi, Mr. Yi Chuan Huang, Dr. Venkat Sharma

Department of Biology



Camptothecin, an anti-tumor metabolite found in the Chinese deciduous tree *Camptotheca acuminata*, inhibits topoisomerase I, an enzyme that reduces supercoiling of DNA. The DNA damage caused by Camptothecin initiates a signaling cascade that targets programmed cell-death or apoptosis. Interleukin-16 (IL-16) is a pro-inflammatory chemokine released during apoptosis. In this study, we attempted to observe how Camptothecin modulates IL-16 expression in Peripheral Blood Mononuclear Cells (PBMC). PBMC were isolated, cultured, and stimulated with various concentrations of Camptothecin (25 ng/mL to 300 ng/mL). Cells were counted using a hemocytometer just before harvesting. RNA was isolated from each time point and was analyzed for IL-16 gene expression using Reverse Transcriptase-Polymerase Chain Reaction (RT-PCR), as described previously (Sharma et al, Immunology, 2000). All gene modulations were normalized to the GAPDH house-keeping gene for semi-quantitation. The RT-PCR products were viewed after electrophoresis using VersaDoc™ Model 4000 Imaging System. The results suggest that IL-16 mRNA expression in PBMC began after 6 hours and peaked at 24 hours. The results also suggest that enhanced IL-16 induction by Camptothecin can modulate HIV suppression in AIDS related B-cell lymphomas, as IL-16 is identified as a key member of the HIV-Suppression factors.

17) Quantification of Photochemically Produced Hydroxyl Radical from Chlorinated Quinone Pesticides

Ms. Diane Ann, Dr. Pamela Vaughan

Department of Chemistry



Use of several radical trapping techniques have been employed to quantify the extent of radical production under solar simulated conditions. Preliminary evidence supports photochemical formation of highly reactive hydroxyl radical ($\cdot\text{OH}$) from the reaction of chlorinated quinone pesticides with water. Compounds of interest include the chlorinated pesticides, dichlone (2,3-dichloro-1,4-naphthoquinone) and chloranil (tetrachloro-1,4-benzoquinone). Rates of photochemically produced hydroxyl radical will be presented as well as proposed degradation products for these pesticides.

38) Degree Sum Ensuring Hamiltonicity

Ms. Andrea Steelman, Dr. Jaromy Kuhl

Department of Mathematics and Statistics



A *graph* consists of a finite nonempty set of vertices with an edge set. A *cycle* in a graph is a sequence of alternating distinct vertices and edges that begins and ends with the same vertex. We say a graph is *Hamiltonian* if it contains a cycle that contains all vertices in the graph. For the past half century, mathematicians have been looking for conditions that guarantee a graph is Hamiltonian. We prove a new sufficient condition that guarantees a graph is Hamiltonian.

37) Statistical Analysis of Cancer Rates in Florida

Mr. Daniel Stadel, Dr. Raid Amin
Department of Mathematics and Statistics



Cancer is the second leading cause of death in the United States. Half of all men and one third of all women in the US will develop cancer during their lifetimes. For this reason it is interesting for everyone to know about the distribution of cancer cases in the state they live in. In order to answer questions such as where is the most likely geographic cluster of cancer in Florida and am I a part of the group at risk for a certain type of cancer, methods and results are discussed. For detecting general differences between age, gender and ethnic groups the ANOVA approach has been used. It is quite difficult to link certain kinds of cancer to specific causing factors because there are so many things in life that can be supportive for developing cancer. Because of this fact the most interesting question we can answer will be what are the areas in Florida with the highest risks of getting cancer. After the detection of differences with the help of the basic statistics approaches, in order to adjust the data the scan statistic approach is introduced and the results will be provided on a Florida map.

18) Using Acetoacetamides in the Syntheses of Pyrrole Amides

Mr. Patrick Barber, Dr. Michael Huggins
Department of Chemistry



Pyrrole amides have shown possibilities for a myriad of uses, including use as hosts in anion binding and molecular recognition due to the multiple hydrogen bonding sites. Many methods are available for producing pyrrole amides; however, most require tedious purification and/or expensive reagents. We sought an inexpensive method for producing a diverse array of pyrrole amides on a large scale and in good yield. Dioxinone (1), a diketene adduct, in the presence of an amine nucleophile, provides an excellent method for acetoacetylation. Acetoacetamides (3) are then converted to their corresponding oximes using standard methods. Using the Knorr pyrrole synthesis, pyrrole amides were prepared from the oxime of the acetoacetamides. For diversity and versatility, a second method utilizing Meldrum's Acid (2) has been successful for the preparation of the acetoacetamide derivatives. We have worked out the synthetic conditions for the preparation of a number of acetoacetamides, and then pyrrole amides, in excellent to moderate yields in 3 or 4 overall synthetic steps.

19) Development of a new teaching lab module: Quantification of reactivity of substituted quinones

Mr. Michael Cochran, Dr. Pamela Vaughan

Department of Chemistry



The goal of the proposed research project was to develop an experiment for undergraduate students relating the relative photochemical reactivity of quinones to other physical properties of the quinone (ex. structure and electrochemical properties). This is a relevant exercise since quinones are present in environmental and biological systems. These compounds may be very reactive and perhaps toxic to aquatic organisms depending on their structure. Using established methods, several different quinones were examined and their photochemical reactivity measured. This reactivity was then correlated to structure (i.e. different reactive groups present) as compared to the parent compound. The lab module specifies different steps to purify the original compound in preparation for the experiment, followed by sample exposure with normal sunlight. The samples were taken through the appropriate reaction sequence to obtain a stable product which was then quantified using liquid chromatography. The photochemical product formation rates were tabulated and related to other physical properties such as electron reduction potentials providing students with a way to predict reactivity based on structural information.

36) Sabermetrics

Ms. Jennifer Powell, Dr. Raid Amin

Department of Mathematics and Statistics



My research project is on sabermetrics, which is the analysis of baseball statistics. This is a broad topic that includes various questions to be answered through the use of different mathematical models. The question I will focus on in the poster is "Which two teams will be advancing to play in the World Series?" and the model I will utilize is the Bradley-Terry Model.

35) Riesz Representation Theorem

Ms. Afsaneh Penton, Dr. Florentina Tone

Department of Mathematics and Statistics



The purpose of this poster is to introduce and explain the Riesz Representation Theorem and give some examples of where and how this theorem is used. To understand the Riesz Representation Theorem, clarification of some terms is necessary, so a part of the poster will focus on defining the concept of a vector space, of an inner-product space, and--most importantly--of a Hilbert space.

20) Tracking the Changes of Anti-oxidants in Tomato

Ms. Amanda Miller, Dr. Pamela Vaughan

Department of Chemistry



Tomato is a well known dietary source of important anti-oxidants, primarily the chemical lycopene but also several other carotenoids, which help prevent diseases such as heart disease and some types of cancer. Food processing methods used to manufacture tomato products (spaghetti sauce, tomato paste, etc) are known to change the conformation of lycopene so that the body can absorb more of the lycopene in prepared products than from raw tomato. The mechanism and cause of this change is not well known. Several preliminary studies outlined in this project aim to determine the causes, extent, and reversibility of the conformational change. The project examined the change in amounts of three carotenoids: lycopene, β -carotene, and xanthophyll (also known as lutein). Data shows that the extent of transformation depends primarily on oxygen exposure and secondarily on light exposure. After three days of light and oxygen exposure, samples have visibly lost a significant amount of the characteristic red color from lycopene. After approximately three weeks, samples in this environment are essentially colorless; however, the same samples incubated without light or oxygen have some orange-red color remaining. Preliminary data also shows that once this transformation has occurred, it is irreversible outside the living plant.

21) Outpost - Brings Relevance to Mathematical Context

Mr. Luke Baden, Ms. Lakshmi Prayaga

Department of Computer Science



In the United States video games have become a multi-billion dollar industry, with a stand-alone gaming console in nearly 41% of American homes (1). This is of course in addition to the number of Americans with personal computers in their homes, two-thirds of America according to the latest census (2). With the difficulties inherent in gaining children's attention in the classroom, combining their love of games with educational goals is increasingly gaining interest in hopes of reaching a newer tech-savvy generation of students. We have been working on a series of educational software geared towards 7th and 8th grade students, in hopes of preparing them for the FCAT. The games will help to show math as it relates to different professions, and also show students different careers. Our title "Outpost" puts children in charge of a futuristic space station, where they face the problems found every day in management, and shows them the uses of math in business and management. The math involved is subtly placed, so that the student will not feel like they are doing homework, they will be having fun and as a result be more likely to learn.

34) Game Theory

Mr. Walter Napier, Dr. Morris Marx

Department of Mathematics and Statistics



My presentation is about the rise of Game Theory throughout the past 100 years and how easily it can be applied to many aspects of life. Game Theory enables mathematicians to model complex human problems and determine the most optimal response. It has shown to be useful in war strategies, poker, biology, business and economics and--not to mention--rock, paper, scissors. John Forbes Nash makes an essential contribution to Game Theory, as shown in *A Beautiful Mind*.

33) Survival Analysis

Ms. Mallory Freund, Dr. Raid Amin
Department of Mathematics and Statistics



My research topic is survival analysis. Survival analysis concerns the time to some event, such as failure of a machine or death of a patient. Several methods are used for survival analysis, such as the Kaplan-Meier estimator, the Savage statistic, the log-rank statistic, the Wilcoxon statistic, and Cox's proportional hazard model.

22) Improving the Heuristic Bound for Pollard's Rho

Dr. John Kolen
Department of Computer Science



Pollard's rho is a randomized algorithm for finding a prime factor of a positive integer. While no theoretical analysis currently exists for this algorithm, a heuristic analysis based upon the birthday paradox claims that the algorithm has a probability of one-half of finding a factor in $1.177 \cdot \sqrt{p}$ iterations, where p is the smallest factor of n , the number we are factoring. This heuristic analysis can be improved by two observations. First, each prime factor of n independently contributes to probability of success. Second, the standard pseudo-random number generator used in the rho algorithm, $f(x) = x^2 + c$, reduces the potential size of the sequence set by one-half on the first iteration. Combining these two observations results in an estimate for one-half probability at $0.8326 \cdot \sqrt{H/k}$ iterations, where H is the harmonic mean of the k distinct factors of n . The divergence of the sum of the reciprocals of all the prime numbers implies that as larger factors are combined, the number of iterations rho needs to find a factor decreases. This prediction and the new heuristic estimate are empirically validated.

23) Bringing Fantasy to Classrooms - Towers of Zhalen

Mr. Jonathon Robertson, Ms. Lakshmi Prayaga

Department of Computer Science



Getting an 8th-9th grade student to pay full attention to his/her educational system is sometimes a hard thing to do. This research is based on the idea that if the students don't feel like they are being forced to learn something, then they are much more willing to be involved in the educational process. One of the many ways that we have chosen to tackle this is by making an interactive fantasy game: Towers of Zhalen. This game focuses on many different areas of math - such as Geometry, Algebra, and Ratios. It also exposes students to multiple career options; Geneticist, Research Chemist, and Construction Engineer are a few examples. As an apprentice, the students will go from tower to tower solving puzzles, rescuing the Wystulk (wise men), and facing challenges from other apprentices. The goal is to release all six of the imprisoned Wystulk so that they can combine their strengths and overcome the seventh (who went mad with power). Like other games sponsored by the Math Matters Grant, it is designed with the student's interest in mind.

32) Pseudorandom Number Generators

Mr. Christoph Frei, Dr. Morris Marx

Department of Mathematics and Statistics



This project analyzes different methods of pseudorandom number generation. Major focus and emphasis is placed on the method of generation, including analysis of the mathematical principles used in the algorithms, statistical randomness of the output, and problems associated with the techniques. The main focus will be placed on Linear Congruential Random Number Generators, such as a Lehmer Random Number Generator.

31) Modeling the Suitability of Wetland Mitigation Sites in a Coastal Watershed

Ms. Kristal Walsh, Dr. Johan Liebens

Department of Environmental Studies



The goal of this research is to produce a suitability map that will guide the selection of sites for wetland mitigation projects using multi-criteria analysis in a geographic information system (GIS). The links between wetlands and the regional landscape are well documented, therefore landscape scale processes must be incorporated into wetland management practices. The characterization of site conditions with the most potential for recreating successful wetlands is a primary goal for fulfilling mitigation objectives. Data processing tools in a GIS are used to model terrain, flow direction and contributing drainage areas from USGS digital elevation models in three coastal watersheds. A spatial data model considers a set of data layers or variables which are assigned a score based on its weight of influence on wetland location. Specific environmental criteria are defined for each variable and assigned a score representing a site's least or most favorable conditions. These include a wetness index, nearness to stream, soil type, surrounding landuse and existing landuse/landcover. An aggregated score for each grid cell is calculated by weighted mean to produce a map of potential locations. Differences between model results and field assessments will be statistically compared by survey, sensitivity analysis and visual inspection.

24) NAGKA-R: Journey to the Top - Bringing Car Racing into Education

Mr. George Trice, Ms. Lakshmi Prayaga

Department of Computer Science



The purpose of this research is to introduce games in education because the current generation of school-aged children can relate to games which are motivating. The games series that we are creating as part of the Math Matters grant is designed to teach math to students through games, which relate to specific real life careers in STEM, IT, public safety, health science, and business. In NAGKA-R a racing game, students are exposed to various career fields in construction and engineering and work as race track supervisor, or pit crew workers while racing go-karts through various courses trying to win a college scholarship. The math is embedded in tasks within the game where the student has to calculate the angles of ramps, turns, and construct objects in the track so that each track is free of hazardous conditions. Students need to solve problems in order to upgrade their go-karts to race better. NAGKA-R is a game that hides the educational content within the fun content so that students learn about various real-life careers and how math plays a part in each career, in a fun and non-intimidating way.

25) A Peripheral Development System for LNS 8085A microcomputer

Mr. James Craven, Dr. Sukumar Kamalasan

Engineering



The project features a working prototype of a peripheral development system designed to interface with the Intel 8085A microprocessor via the Intel 8156 programmable peripheral interface. The original purpose of the LNS 8085A kit was to bypass the time-consuming development of the basic architecture needed to set up a working microcomputer. To overcome the drawbacks of unavailability of direct access to the address, data and control signals, all input and output operations had to be performed through either the 8156 or through the serial data port. This arrangement has yielded the proposed design of this project, which currently consists of an Input/Output (I/O) board and a hexadecimal keypad. The I/O board will be connected directly to the interface bus of the 8085A kit and will allow the user to greatly expand upon the limited I/O capabilities of the 8156. With the addition of a hexadecimal keypad, a 7-segment LED readout array, and a piezo speaker, the user is provided with a primitive but fully functional user interface that will serve as a platform for the development of future interface projects.

30) Submarine Groundwater Discharge into Bayou Texar

Mr. Jonathan Stewart, Dr. Matthew Schwartz

Department of Environmental Studies



Submarine groundwater discharge (SGD) can transport contaminants, such as fluoride and naphthalene, which may have negative impacts on human health, recreation and the environment. Radon-222 is a tracer compound for SGD and is formed from the decay of radium, which is often found in coastal aquifers. Bayou Texar, a subbasin of Escambia Bay, is located down gradient of two National Priorities List sites, and contaminants are believed to be discharging into the bayou via SGD. Surface water samples were collected using Niskin bottles along the length of the bayou and later analyzed for radon-222 and radium-226. In addition to the water data collected, data from a parallel study on radon and radium concentrations in the Bayou Texar benthic sediments was used to determine the amount of radon entering the bayou from SGD. A zone of excess radon, indicating SGD, was found in the north end of the bayou with a gradual decrease in radon concentration (ranging from 74 dpm/L to 13 dpm/L) moving southward. Locating and quantifying the flux of SGD in Bayou Texar is the first step in determining the groundwater-induced flux of contaminants into Bayou Texar.

29) Effects of Organic Carbon Loading on Coupled Nitrification/Denitrification in Estuarine Sediments

Mr. Brandon Jarvis, Dr. Matthew Schwartz

Department of Environmental Studies



Microbial denitrification is an important biogeochemical process in the removal of excess nitrogen species from coastal marine systems. The presence of excess nutrients within estuarine environments is responsible for the development of eutrophic conditions and subsequent growth in pelagic biomass. The response of benthic microbial communities to simulated algal bloom conditions were studied using laboratory sediment incubations. Utilizing ^{15}N tracer techniques, rates of coupled nitrification/denitrification and nutrient flux were measured through various amounts of organic carbon additions. The addition of organic carbon substrate had a rapid and positive effect on denitrification rates as a whole, although the extent of this effect appears to be dependent on the amount of carbon amended to the sediment. Incubation cores receiving the greatest amounts of organic carbon yielded N_2 fluxes 3-4 times greater than controls. Microbial denitrification in these cores was greatest within 48 hours of carbon deposition. This shift in denitrification can be attributed to both autochthonous and allochthonous nitrate pathways, as 60-70% of denitrification resulted from coupled nitrification processes. This rapid benthic response suggests that denitrification is significantly enhanced during the initial stages of a phytoplankton bloom, and may serve as an important pathway for the removal of estuarine nitrate.

26) Temperature Control and Stabilization of a Crystal Oscillator

Mr. Gerald Swann, Mr. Bill Ford, Dr. Sukumar Kamalasan

Engineering



This paper presents a proportional control circuit for temperature control and stabilization of an electronic circuit (i.e. a crystal oscillator.) By precisely controlling the temperature of the frequency-determining element of an oscillator, a very stable signal in the frequency domain will be obtained. Additionally, holding the temperature constant at the crystal turning point will minimize the effect on output frequency by even small temperature changes. The control circuit consists of three parts. In the first part, a temperature sensor and precision voltage regulator feed a high impedance differential input amplifier. That is followed by a moderate gain DC amplifier. The third part of the circuit is a current amplifier feeding a resistive heater assembly that is contained within a thermally insulated housing. Conventional negative feedback is used in each part of the control circuit to allow very stable control of the output current. The circuit offers fast warm-up and fractional degree control of the temperature over the range of ambient temperatures typically encountered in an indoor environment.

27) Investigation of groundwater influx to Bayou Texar - Pensacola, FL: assessment of radium concentrations (and radon emanation) from Bayou Texar sediments

Mr. Joseph Beutler, Dr. Matthew Schwartz

Department of Environmental Studies



I have collected sediment samples from Bayou Texar - Pensacola, FL to assess these samples for the amount of radium they contain. By assessing this factor, I can determine what percentage of the water-column-excess radon is coming from surface, subaqueous sediments. Knowing this, we can then identify how much radon is coming from submarine groundwater discharge (SGD) into Bayou Texar. To identify and quantify SGD into Bayou Texar, we first identified zones of excess radon in the water column. Because radon is formed from the natural radioactive decay of radium, there should be equal concentrations of radon and radium in a closed system (i.e., a system that has no net additions or losses of either isotope); this condition of equal concentrations is known as secular equilibrium. If there is more radon present than can be accounted for by the radium, then we have a condition called excess radon; excess radon suggests that the radon dissolved in the water column must be coming from some source other than radium in the water column. Likely sources are bottom sediments and SGD.

28) Characterizing the relative velocity of seagrass blades under oscillatory flow conditions in the Santa Rosa Sound, Florida

Mr. Kevin Bradley, Dr. Chris Houser

Department of Environmental Studies



Various factors contributing to the ability of seagrass to attenuate waves and currents have been identified in the literature, but the roles of plant-induced reflection and movement remain poorly understood. The goals of this localized study were to quantify the wave attenuating properties of a seagrass bed under normal forcing conditions, measure the oscillatory flow velocity directly above a seagrass canopy, measure the velocity of individual seagrass blades, and calculate the relative velocity of seagrass blades under oscillatory flow conditions. A linear array of five RBR wave and tide recorders were deployed across a combined *Thalassia testudinum* and *Halodule wrightii* seagrass bed, with the resulting decay in wave height expressed as an exponential drag coefficient. Two Nortek velocimeters placed above the seagrass canopy measured flow velocities while a digital video recorder captured movement of individual seagrass blades. Frame by frame analysis of the video facilitated the quantification of seagrass movement under oscillatory flow. The relative velocity of the seagrass blades were calculated as the difference in water velocity and blade velocity. The drag coefficient and relative velocity were used to calculate plant induced horizontal force.