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INHERITANCE OF CHLOROPLAST DNA (CPDNA) IN LOBELIA SIPHILITICA

By Alicia Durewicz

Keywords: Chloroplast, Inheritance, Heteroplasmy

In plants and animals, offspring typically inherit half of their nuclear genes from each parent, and all of their mitochondrial and chloroplast genes from only one parent (usually from their mothers). However, recent studies have shown evidence of paternal inheritance and bi-parental inheritance of extra-nuclear genes in several species. We investigated patterns of chloroplast inheritance in a native flowering plant, Lobelia siphilitica. Dams from six populations were crossed with sires from twelve populations to track inheritance patterns in the offspring. Fifty-five crosses were examined by sequencing the rps16-psbK region of the chloroplast genome and assigning unique chloroplast sequence types to each individual parent and offspring. We found that offspring matched only their mothers in over eighty percent of the crosses, suggesting that strict maternal inheritance is predominant in this species. However, we found evidence of heteroplasmy (multiple chloroplast types within individuals) in several parents and offspring, and in one cross, strict paternal inheritance was observed in one third of the offspring. Instances of heteroplasmy and paternal inheritance were restricted to four crosses, two of which had the same mother, and all mothers coming from the same population. Understanding the mechanisms and frequency of deviation from maternal inheritance is important for interpreting patterns of evolution in natural populations.

SYNTHESIS AND CHARACTERIZATION OF ANTIOXIDANT COATED GOLD NANOPARTICLES

By Eileen Alexander

Keywords: Nanoparticles, Cell culture

It has long been known that free radical oxidation is detrimental to living cells and tissues. Many disease pathologies have been shown or thought to be due to the presence of these free radical oxygen species (ROS). In the presence of these ROS, alterations to normal chemical structure of biologically relevant molecules can be produced. This change in chemical structure however small, can cause large structural changes and can affect the integrity of the cell as well as how the cell functions. These changes can ultimately lead to cell death. It would be extremely valuable to find a way to counter act the reactive oxygen species before they can impart damage to the cellular structure. Antioxidants are a group of molecules that have been shown to process such properties. This study focuses on synthesis and characterization of antioxidant coated gold nanoparticles. Size control has been shown by concentrations studies and monitored by UV-Visible spectroscopy. IR spectroscopy has been performed to show any chemical changes that may have occurred during synthesis of the nanoparticle.

HURRICANE PREPAREDNESS AND PLANNING IN COASTAL PUBLIC SCHOOL DISTRICTS

By Jessica Van Meter

Keywords: Hurricanes, Schools, Preparedness

Hurricanes pose a yearly threat to the residents and tourists of the Atlantic and Gulf Coasts of the United States. They can bring with them tremendous storm surge, destructive winds, intense rain, extreme flooding, and profound damage. While many cities, counties, and states have extensive evacuation routes and procedures for hurricane preparation and reaction, literature on preparations in schools seems to be lacking. Most children are in school for at least half of the hurricane season and could possibly be threatened while at school.

The first part of this research will examine plans in place for schools in the event of a hurricane threat. Issues such as preparations already in place, evacuation procedures, and requirements for action will be studied. The second part of this research will examine the procedures for school buildings themselves and whether they are boarded up, opened to the public as community shelters, or used as refuges of last resort during and after a hurricane.

This research will compare various levels of school preparedness to demographics of the districts, hurricane history, and proximity to the coast. Demographic factors considered may include median income, property values, size of the district, number of schools threatened, and race. Historical information to be considered will include the accuracy of previous watches and warnings, landfalls, damages, and frequency of threats. I will examine whether these factors can be used to explain variability in preparedness and planning.

This research will look at information from school districts along the coastal United States from Texas to North Carolina. Surveys will be distributed to school administrators requesting information on their plans and procedures for hurricane events. Specific information requested will include timetables, hurricane strength requirements, personnel to be evacuated, and sources of hurricane information. Much of the other research data will be obtained from previous hurricane records, school websites, and the Census Bureau.

HOX GENE FUNCTIONS AND DIVERSITY WITHIN THE PRIMATE ORDER

By Matthew C. Hudnall

Keywords: Hox, Primate, Evolution, Development

Encoding transcriptional regulatory proteins that help control the anteroposterior axial patterning of all bilaterians, Hox genes have become famous for the level of conservation found across taxa and throughout vast distances of evolutionary time. The Hox gene family plays a key role in embryonic development and contributes significantly to the diversity of animal design. Until now, a comprehensive comparative analysis of Hox genes within the order Primates has not been undertaken. The aim of this research is to (1) identify inter-species nucleotide divergences and (2) ascertain any phenotypical consequences of primate Hox gene divergences found. Homo, Pan, Pongo, Macaca and Callithrix genomes are being analyzed for this study.

BERNINI'S CORNARO CHAPEL: VISUALIZING MYSTICISM IN THE AGE OF REFORMATION

By Adam Ladd

Presentation Keywords: Bernini, Rome, Counter-Reformation

The Cornaro Chapel is hailed by many art historians as being among the greatest of Baroque masterpieces, and as such, one of Gianlorenzo Bernini's finest efforts. Various facets of the visual arts converge in this space as a harmonious whole, all in an effort to create and frame a sculptured scene of deep spiritual fervor- the Ecstasy of St. Teresa. Flanking this sculpture are eight prominent members of the Cornaro family, four on each wall. They appear to be watching from theater-boxes, as if Teresa's vision is being staged for their viewing. Each figure is actively engaged in watching, discussing, or reading about this staged scene.

This paper examines the interaction between the viewer, the depicted Cornaro men, and the scene of Teresa's ecstasy. The result of this examination is a fresh interpretation of Bernini's Cornaro Chapel. The actions of the Cornaro men are commonly interpreted as providing a model for the viewer to imitate as they view the Spanish mystic's spiritual union with God. In this scenario, the viewer would be encouraged to read about and discuss the mystic's experiences and writings. In light of Counter-Reformation politics and the controversy surrounding not only Teresa, but mysticism as a religious phenomenon in the sixteenth century, this interpretation becomes problematic. I suggest that the depicted Cornaro men do not provide a model for the viewer to imitate, but rather provide a model in which the Church's role in canonization and art production is reinforced.

IDENTITY AND PLACE CONSTRUCTION THROUGH MEDIA: HOW CANADIAN SPORTING MEDIA CREATES POPULAR NOTIONS OF NORTH AMERICAN AND EUROPEAN ICE HOCKEY STYLES AND PLAYERS

By Alex Colucci

Keywords: Sport, Sports Media, Ice Hockey, Sweden, Canada

A stereotype is a widely held, oversimplified popular belief about a social group, often perpetuated through the use of labels. Sport is intrinsically social and political. Popular media has the power to shape our understandings of spaces, places and people. Thus it shapes our understandings of social groups and the spaces and places in which they exist; popular sporting media is no different. Through an analysis of language used in popular Canadian sporting media in reference to European Ice Hockey players playing in North America one may begin to understand the construction of competing North American and European Ice Hockey identities. Sweden, as one of the main exporters of Ice Hockey players to North America, and Swedish players in North America are key to the analysis of the discourse of sporting media in Canada.

THE EFFECT OF PEER INFLUENCE ON RUNNING SPEED, ENJOYMENT, AND PERCEIVED EXERTION IN INTERCOLLEGIATE DISTANCE RUNNERS

By Andrew Carnes

Keywords: Distance Running, Peer Influence, Exercise Motivation, Enjoyment, Perceived Exertion, Physical Activity Behavior

Background: Emerging studies have indicated a potentially important link between peer influence and physical activity behavior. The presence of an unknown peer has been shown to significantly increase physical activity behavior in overweight children while the presence of a friend increases physical activity behavior in both non-overweight and overweight children (6,8,9,19,21-24). While these results illustrate the potential importance of peer influence on physical activity behavior, the majority of the research focuses only on the amount and enjoyment of physical activity in children and young adolescents. While less studied than children, many fitness organizations recommend that adults exercise with a partner or friend to increase motivation to exercise. It is also common practice for athletes to train with fellow athletes and/or teammates. However, little research has explored the impact of peer influence on training in adults, much less competitive athletes. In such athletes, like non-athletes, exercising with a group of teammates or training partners may increase motivation for that training session. If this is the case, training with a peer may also increase intensity and adherence to a training regimen which may ultimately improve athletic performance. Despite the common practice of athletes training with fellow athletes there is no research we are aware of that has examined the impact of peer influence on the intensity, enjoyment and ratings of perceived exertion (RPE) of an exercise session in a group of competitive, highly-trained athletes.

Purpose: The purpose of the proposed study is to determine if, relative to an alone condition, exercising with a teammate or training partner affects running pace, relative intensity, perceived exertion, and enjoyment during a 30-minute training run at 55-75% VO2 max in highly trained collegiate distance runners. We hypothesize that the presence of another runner will increase running speed, relative intensity, and enjoyment while RPE remains constant.

Methodology: This is two a condition (alone, with a peer) repeated measures design with condition serving as the within-subjects variable. Participants (n=12) will consist of healthy male competitive distance runners, age 18-21. Runners will be recruited from area collegiate cross country and track teams. Each participant will report to the Kent State University Applied Research Laboratory on three occasions. During the first session participants will complete informed consent, be measured for height and weight and complete baseline fitness testing. The next two sessions will consist of running trials under two different conditions (alone, with a peer). During each running trial, incline will be held at 0% and the runner will control the speed. The following measurements will be recorded every five minutes: running speed, heart rate and RPE. At the conclusion of the run, total distance ran, and liking (enjoyment of the run) will also be recorded.

THE EFFECTIVENESS OF 90KSU

By Tom Kresch, Curtis Eaton Jr., Anne Dudley

Keywords: 90KSU, Intercollegiate Athletics, Higher Education

Intercollegiate athletics has developed into a staple of the higher education environment, certainly at the division I level. Conferences including the SEC, Big 12, Big 10, Big East, Pac-10, and the ACC devote a significant portion of their budget to funding top flight athletic departments, equipped to garner media exposure at the highest level. With the additional emphasis placed on college sports, the gap between the "haves" and the "have nots" continually grow more distinguished, with the Ohio States, Notre Dames, and USCs of the world setting the trend as to what the "have nots" wish to aspire to. Among those institutions, include those that participate within the Mid-American Conference, or the MAC. The MAC represents 13 FBS colleges and universities that have the opportunity to play in Bowl games, sign the nation's top recruits, carry the maximum amount of scholarships, and gain exposure on nationally televised games, and yet are clearly a step below the automatic qualifier conferences. As a result, these programs must generate creative campaigns to entice fans to attend to games. Here at Kent State University, with the football program struggling not only on the field, but also with attendance rates, Athletics Director Joel Nielsen and the rest of the athletics department devised the "90KSU" marketing campaign, which took aim at selling at least 90,000 tickets for six home football games.

The campaign had been originally devised in an effort to accomplish two main objectives: give students, faculty, staff, and the community a common rallying point, and to keep Kent State University Football's status as a competing member of the division I Football Subdivision. With the lack of a winning tradition for the Golden Flashes, overall interest in Kent State football declined greatly, to the point where KSU was in danger of being forced to division I-AA status, a penalty for those programs that are unable to sell at least 90,000 tickets in one out of every three seasons. Additionally, with Big Ten powerhouses like Ohio State and Penn State within close proximity, competition for fandom remains high. A successful football program has the opportunity to affect the entire institution, conversely, so would the lack of success. Primarily, in regards to the "90KSU" campaign, those affected would hopefully include the student population, along with the university community as a whole.

BEHIND THE MUSIC: TITIAN'S VENUS AND MUSICIAN PAINTINGS WITH AN ICONOGRAPHIC STUDY ON INSTRUMENTS IN ALLEGORICAL ART

By Ashlie Louie Sochor

Keywords: Gender Studies, Art, Renaissance

The artist Tiziano Vecellio, commonly known as Titian, is known for his innovative portrayals of the female nude as mythological women, particularly Venus. The Venus and the Musician series, as the paintings have been collectively called by scholars, consist of five known works that are categorized in two groups; one group depicts an organist and dates to the 1550s, and the second group, executed ten years later, has a lute player. There have been various questions concerning the context of the paintings that can be addressed, since there are no mythological tale origins to decipher this theme, as to the very purpose of these paintings. Another area of interest is the instruments chosen to be portrayed in the paintings and their references in art. Through examining the images of Venus as the ideal beauty in comparison to theories of love and female beauty in Renaissance Italy, as well as the sensual connotations of the courtly instruments played by the male musician, it is shown that the concept of Venus and the Lute Player/Organist not only embodies humanist ideals of the time but gives the goddess of love a different role. Titian gives Venus the role of not only goddess, lover, and even mother of Cupid, but as an ideal beauty in every one of the senses, not just appearance. It becomes evident that beauty is not just a physical entity, but it may be achieved in various methods in order to accomplish a standard for women during the sixteenth-century.

PSYCHOMETRIC PROPERTIES OF THE PTSD ALCOHOL EXPECTANCY QUESTIONNAIRE (P-AEQ) AND A TEST OF THE SELF-MEDICATION HYPOTHESIS IN AN UNDERGRADUATE POPULATION

By Bryce Hruska

Keywords: Posttraumatic Stress Disorder (PTSD); Trauma; Alcohol Problems; Alcohol Expectancies; PTSD Alcohol Expectancy Questionnaire (P-AEQ)

Posttraumatic stress disorder (PTSD) and alcohol use disorders (AUDs) frequently co-occur. Epidemiological studies indicate that up to 52% of men and 28% of women with PTSD also meet lifetime criteria for alcohol abuse or dependence (Kessler, Sonnega, Bromet, Hughes, & Nelson, 1995). Several explanations for this elevated comorbidity have been suggested (Brady, Back, & Coffey, 2004; Jacobsen, Southwick, & Kosten, 2001); however, the prevailing explanation is the self-medication hypothesis (i.e. that individuals with PTSD use substances such as alcohol to relieve the psychological distress associated with their symptoms) (Stewart, 1996; Stewart, Pihl, Conrod, & Dongier, 1998). In order to examine the self-medication hypothesis in more detail, Norman, Inaba, Smith, and Brown (2008) created the PTSD Alcohol Expectancy Questionnaire (P-AEQ), a 27-item self-report questionnaire that asks respondents about the expectancies that they have concerning the effects that drinking alcohol will have on their PTSD symptoms. The P-AEQ's factor structure is characterized by the presence of two subscales measuring two different sets of expectancies: a positive expectancy subscale reflecting expectations that drinking alcohol will improve PTSD symptoms and a negative expectancy subscale reflecting expectations that drinking alcohol will worsen PTSD symptoms. Despite the potential utility that such a measure may have in furthering knowledge about PTSD-AUD comorbidity, relatively little research considered the psychometric properties of this instrument or utilized it in research examining the relationship between PTSD and AUD. Thus, the present study sought to examine the psychometric properties of the P-AEQ in a sample of undergraduates. Furthermore, to test the self-medication hypothesis, the present study sought to determine if individuals who reported higher PTSD symptom levels and greater scores on the positive expectancy subscale (but not the negative expectancy subscale) of the P-AEQ reported more problems with alcohol. Results revealed strong internal consistency in each of the P-AEQ subscales (positive P-AEQ $\alpha = 0.91$; negative P-AEQ $\alpha = 0.90$). In addition, the positive and negative subscales of the P-AEQ showed good convergent and discriminant validity with the positive and negative alcohol expectancy subscales of the Comprehensive Effects of Alcohol Questionnaire (CEOA: Fromme, Stroot, & Kaplan, 1993). Finally, moderated multiple regression analyses revealed that individuals with higher levels of PTSD symptoms and greater scores on the positive subscale of the P-AEQ reported more problems with alcohol ($p < 0.05$). However, contrary to our hypothesis, it was also found that individuals reporting higher levels of PTSD symptoms and greater scores on the negative subscale of the P-AEQ also reported more problems with alcohol ($p < 0.05$). Collectively, these results suggest that the P-AEQ possesses good psychometric properties and that individuals with elevated scores on each subscale of this measure may possess high levels of PTSD symptoms and alcohol problems.

THE VAEAKAU-TAUMAKO NAVIGATIONAL TOOLKIT: A COGNITIVE CONSTRUCT FOR NAVIGATION IN THE PACIFIC

By Cathleen Pyrek

Presentation Keywords: Navigation, Oceania, Pacific, Cognitive Construct

Different voyaging communities in the Pacific use a variety of non-instrument navigational techniques for wayfinding across long distances. For example, the use of a star compass has been well documented for several groups. Wind compasses are less well documented and appear to be less utilized throughout the region. This research seeks to understand the Vaeakau-Taumako wind compass as a component of the larger navigational toolkit used by long-distance voyagers of Taumako and nearby Vaeakau Islands. Both the wind compass and the navigational toolkit serve as cognitive frameworks for navigation.

EFFECTS OF NON-SELECTIVE MECHANISMS ON SEX RATIO VARIATION IN LOBELIA SIPHILITICA

By Hannah Madson

Keywords: Sex Ratio, Lobelia Siphilitica, Gynodioecy, Gene Flow, Genetic Drift

Understanding patterns of within-species diversity is a fundamental goal of evolutionary ecology. Both selective (i.e., natural selection) and non-selective (i.e., drift, founder effects, gene flow) forces may contribute to variation among populations, however the relative effects of these different evolutionary forces on particular traits is not always clear. Gynodioecious species, in which populations contain both hermaphrodites and females, are ideal for examining these forces because sex ratio may vary over the species' geographic range. For example, in the native flowering plant Lobelia siphilitica, high-female populations are concentrated in the southern-central part of its range, where mean annual temperatures are also higher. In contrast, females are rarely encountered in the northern part of the species range, and populations largely contain hermaphrodites. Although these differences in sex ratio may be caused by changes in temperature across latitudes, non-selective mechanisms may still play an important role in sex ratio because they affect whole genomes, which include the sex-related genes in both nuclear and cytoplasmic genomes. To examine how non-selective mechanisms may be contributing to this pattern of sex ratio variation, we characterized the sequence variation in the rps16-psbK intergenic region of the maternally inherited chloroplast genome. Mutations in this region should not be subject to natural selection, so we use this as a neutral genetic marker to estimate patterns of genetic drift within populations and gene flow between populations. We analyzed the sequences of 275 individuals from 58 populations across L. siphilitica's range and grouped them into fifteen unique sequence types, or haplotype groups. We found no correlation between genetic and geographic distance, indicating that geographic isolation does not explain the variation in haplotype groups between populations. Additionally, we found that populations with and without females did not differ in the composition of their haplotype groups, suggesting that there are no 'gynodioecious' haplotypes. However, the populations with females contained multiple haplotypes, regardless of population size, while the populations without females only had multiple haplotype groups when populations were small (< 100 plants). We found five haplotype groups restricted to peripheral populations where female frequencies are low, suggesting that metapopulation dynamics may be significantly affecting patterns of sex ratio variation.

PRELIMINARY CHARACTERIZATION OF THE HIGHLAND-VIJAYAN THRUST BOUNDARY ZONE, SRI LANKA

By Inoka H. Widanagamage

Keywords: Proterozoic, Thrusting, Granulite, Monazite

Sri Lanka, a small-scale aggregate of contrasting crustal domains, has been the focus of lower crustal research for the past two decades. The timing of high-grade granulite metamorphism in the central Highland Complex (HC) of Sri Lanka is well-constrained at 570-550 Ma (Kroner et al., 1994; Prec Res; Sajeev et al., 2010, Geology). Amphibolite facies metamorphism of the adjacent Vijayan Complex (VC) to the east is less well constrained but apparently somewhat younger (ca. 510 Ma; Holzl et al., 1994; Prec Res). Additionally, the timing and nature of juxtaposition (via thrusting) of the HC above the VC is uncertain. The contact between the HC and VC, characterized by strong deformation, exotic tectonic slivers, migmatites, local serpentinite bodies, magnetite deposits, and gold mineralization is a major suture separating the Paleoproterozoic HC from the Grenville-age VC. Our goal is to ascertain the conditions and timing of deformation along this important suture. We have collected 21 oriented samples within and near (<6 km) the HC-VC boundary zone. West of the boundary (granulite terrain), coarse garnet-sillimanite-graphite gneiss with 5 mm euhedral inclusion-rich garnets are locally sheared with garnet elongate in the foliation plane. Within the boundary zone, garnet-(amphibole)-biotite gneisses exhibit a strong mesoscopic fabric consisting of ribbon quartz and compositional layering. Microscopically, static annealing is prevalent. East of the HC-VC deformation zone, coarse plagioclase-biotite orthogneisses exhibit compositional banding, augen, and incipient migmatization. EMPA in situ spot-dating of monazite grains from texturally characterized samples collected in this study is likely to yield important information on the timing of thrusting and the timing of amphibolite metamorphism of the VC. Initial SEM imaging reveals two populations of accessory monazite from a strongly deformed boundary sample: large (300-500 micron) euhedral grains and small (30-70 micron) subrounded grains. We have also imaged monazite grains in the sheared granulite gneiss samples described above. Deformed migmatite lenses spatially and temporally inferred to be associated with thrusting (Kleinschrodt, 1994, Prec Res) are also being investigated in this study.

WATER TABLE VARIABILITY ON THE PITTED KARST PLAIN, YUCATÁN, MEXICO

By Jennifer Burrell

Keywords: Carbonate terrain; Conduits; Karstic Aquifer; Sinkhole

Yucatán, Mexico is dominated by Tertiary limestone which is punctuated by a series of sinkholes fed by a complex system of conduits or pathways within the groundwater system. The region is host to the Chicxulub impact crater as well as the Northern Pitted Karst Plain (location of the present study) resulting in a diverse distribution of surface sinkholes. Via the emplacement of a water gauge, several soil moisture probes, and regional weather data the objective of this study is to determine the spatial and temporal variability of the water table near Espita, Yucatán, Mexico and determine if there is a correlation between 1. Soil moisture variability and water level variability and 2. Water level variability and daily weather patterns. Preliminary results show no correlation between water level variability and soil moisture variability. Results are still pending for water level variability and regional precipitation and atmospheric pressure

INTERNET MEMES IRL

By Jessica Heffner

Keywords: Rhetoric, Memes, Internet

When people began communicating across the internet they took many real world conventions and ideas of rhetoric with them. In the recent past, what has been created in the internet, in regards to speaking, writing, and rhetoric is now coming back to influence the real world communication. Internet based communication and its influences and effects on real life writing and rhetoric is the critical problem of this paper. To better understand how people are bringing internet culture into real life situations, I propose to study internet memes through a rhetorical lens that is influenced by the eighteenth, nineteenth, and twentieth century rhetoricians.

GEOPHYSICAL CHARACTERIZATION OF THE POROSITY DISTRIBUTION IN THE CLINTON FORMATION, ASHTABLUA COUNTY, OHIO

By Julie Gouin

Keywords: Geophysical, Ohio Geology, Clinton Formation

The Clinton Formation in Ashtabula County is one of the largest gas field in Ohio. This project helps to expand research conducted by Ohio Geological Survey (OGS) and US Department of Energy (DOE) on deep subsurface geology in Ohio. A combination of cores and geophysical logs were used to correlate the Clinton Formation and to help with an environmental analysis and porosity distribution.

Thirty geophysical well logs were correlated using Geographix. Reflectance was measured on one set of cores as a means to help identify depositional patterns and composition. Thirteen plugs were taken from the core. All 13 had thin sections made, to help with porosity estimates, composition and grain interaction. Eleven were analyzed by Weatherford Labs for porosity and permeability. Laboratory measurements were made to verify well log measurements.

The Clinton Formation is Silurian interbedded sandstone, shale and carbonates, which changes with location. This makes it difficult to predict the distribution of sands and shales within the Clinton over extensive periods. This study will help to explain variation in the Clinton Formation in Ashtabula County.

AMERICAN STYLE HIGHER EDUCATION IN BULGARIA

By Katharine Clair

Keywords: Higher Education, Bulgaria, Internship

I will focus my presentation on the American University in Bulgaria and its role as one of the top universities in Bulgaria. I will compare the American style education that AUBG provides with traditional Bulgarian higher education and the influences that communism has had on development as well as the influences that the Bologna Process has had. Please note that I will not be able to attend the symposium due to the scheduling of my practicum but I will make sure the poster is in place.

PURGING DISORDER: AN EXPLORATORY INVESTIGATION OF PHENOMENOLOGY, PSYCHOLOGICAL CORRELATES, AND DISTINCTIVENESS AS A DIAGNOSTIC CATEGORY

By Kathryn E. Smith

Keywords: Eating Disorders, Purging Disorder, Body Image, Dieting, Women

Purging Disorder (PD) is an understudied pattern of behaviors within the Eating Disorder Not Otherwise Specified (EDNOS) diagnostic category. PD is characterized by recurrent purging behavior in the absence of objective binge episodes, an undue influence of weight and shape on self-evaluation, and normal weight (e.g., Binford & leGrange, 2005; Keel, 2007). Although such categorization suggests PD is not as clinically significant as other eating disorders, it remains to be determined if PD is distinct from other eating disorder categories.

The present study assessed the phenomenology, clinical significance, and distinctiveness of PD. A female undergraduate sample (N= 91) consisting of individuals with PD (n= 17), Bulimia Nervosa (BN; n=35), restrained eaters (n=18), and healthy controls (n=21) completed self-report measures of eating pathology, body image disturbance, and psychological correlates, as well as other eating disorder symptoms (e.g., frequency of binges and compensatory behaviors). Three multivariate analyses of variance (MANOVA) compared the groups on conceptually related dimensions. There was a significant multivariate effect for all MANOVAs (eating pathology: $F(3, 87)=11.78$, $p<.001$; body image: $F(3, 87)=10.16$, $p<.001$; psychosocial variables: $F(3, 87)=2.13$, $p<.01$). Post-hoc analyses indicated the PD group both differed from and resembled the BN and restrained eater groups. The BN group reported significantly more body dissatisfaction and subjective and objective binge episodes (SBEs and OBEs, respectively) than the other groups; however, the PD and Restrained Eater groups reported significantly more SBEs than the control group. There were no significant differences between the PD and BN groups on the frequency of purging behavior, $t(48)=1.29$, $p=.20$. Post-hoc analyses indicated all eating pathology groups reported significantly higher levels of dietary restraint, fasting, and SBEs than controls, though the eating pathology groups did not differ on levels of thin-ideal internalization.

These findings are consistent with empirically validated etiological theories of eating pathology, namely Restraint Theory (Herman & Polivy, 1980) and the dual-pathway model of bulimic pathology (Stice, 1994), in the development of PD. Restraint Theory, which posits dietary restraint is an important factor underlying various forms of eating disorders, was supported by the finding that all eating pathology groups reported more dietary restraint relative to controls. Also, the frequencies of SBEs, OBEs, and compensatory behaviors among the groups suggest dietary restriction may lead to subjective, if not objective, binge episodes. Continued dietary restraint and SBEs may lead to purging behavior in some individuals (characterized as PD). In turn, some of these individuals may proceed to engage in OBEs (characterized as BN). The findings also support the dual-pathway model, which posits that the internalization of sociocultural pressures is a preceding factor in the development of dietary restraint and bulimic symptomatology. Taken together, the results indicate that PD represents a clinically significant syndrome, and that PD may be better conceptualized as a subtype within the BN category. Implications will be discussed.

BIOGEOGRAPHY OF NON-MARINE OSTRACODES FROM A LATE-GLACIAL BERINGIAN LACUSTRINE RECORD

By Kathryn J. Wells

Keywords: Ostracodes, Beringia, Late-Glacial, Lacustrine

New analysis of core 70-92 taken in the Chukchi Sea at ¬¬¬69°57.2', 165°21.6' during a previous investigation by the USGS indicates an ostracode record of terrestrial freshwater environments dated from ca 13,000 – 11,000 14C years BP. This record is composed of four ostracode zones beginning at 12,640 + 45 14C years BP with fresh to slightly oligohaline fauna (Zone 1), including Holarctic species Pteroloxa cumuloidea and Candona rectangulata. This system gives way to a freshwater habitat (< 1000 mg/l) ranging from ephemeral (Zone 2) to permanent (Zone 3) systems, ca 12,470 + 45 14C years BP. Zone 2 includes Fabaeformiscandona rawsoni and Limnocythere inopinata. Zone 3 is dominated by Cytherissa lacustris and Candona candida. This freshwater basin is subsequently infilled and replaced by wetland peats, containing species of Cyclocypris and Cypria. The final zone culminates in a marine transgression. Only Zone 1 contains species which are exclusively found in the high arctic today. Subsequent zones are characterized by freshwater species that occupy temperatures commonly present in modern mid-latitude North America and Eurasia. Biogeography of these species drawn from modern ostracode distributions highlights the absence of high arctic and polar fauna in Zones 2-4, suggesting that following Zone 1, temperatures were similar to modern sub-arctic mid-latitude ranges. This conclusion is consistent with results from other workers on pollen and plant macrofossil records for the region, and help to narrow the time window in which fauna and humans would have been most likely to cross the Bering land bridge.

MATING SYSTEM COMPARISON OF LONICERA MAACKII (AMUR HONEYSUCKLE) PLANTS IN THE UNDERSTORY AND ALONG THE EDGES OF A COLUMBUS, OHIO WOODLOT

By Kelly Barriball

Keywords: Mating System, Local Habitat Variation, Outcrossing Rate, Invasive Plant

Lonicera maackii (Amur honeysuckle) is an aggressive invasive shrub with prolific flower and fruit production. This shrub competes with its native counterparts by expanding its leaves in early spring and keeping them well into the fall. Amur honeysuckle is currently the dominant understory shrub in the forests of southwest Ohio, and the plant is present in 35 counties in the state. Lonicera maackii grows densely along the edges of woodlots, with sparser growth in the low-light understory. Plants along the edge have greater potential for pollinator visitations, and as a result, produce more viable fruits than plants growing in the forest interior. Variable pollination patterns will influence the genetic diversity and reproductive output of a flowering plant population. My objective is to examine whether variation in the pattern of pollen deposition influences the genetic structure of a population of L. maackii within the understory and along the edges of a fragmented Ohio woodlot. Using microsatellite data for six polymorphic loci, I found that there was little genetic differentiation between the edge and the interior, with moderate inbreeding. An AMOVA found that most of the molecular variance for both habitats can be attributed to within individual variation because of high occurrences of heterozygosity. A multilocus analysis of preliminary data from the progeny of edge plants resulted in a very high outcrossing rate (tm = 0.97), suggesting that little selfing is occurring along the edge of the woodlot. Biparental inbreeding is moderate, which is to be expected with flowering plants that grow closely in dense stands. Data are currently being collected for the remaining edge and interior progeny. If I find that reproductive output is indeed variable based on habitat type, management strategies could be fine-tuned to focus on the type that is most likely to facilitate population spread.

LGBT STUDENTS AND LEADERSHIP

By Shilpi Tiwari

Keywords: Lesbian, Gay, Bisexual And Transgender; Student Involvement

The program provides an overview of the development of lesbian, gay, bisexual and transgender students as it pertains to leadership development. The program will allow student affairs professionals to understand how leadership in student activities promotes the identity development of lesbian, gay, bisexual and transgender students and, more importantly, address how leadership and sexual identity contribute to developing purpose.

TROPICAL CUISINE: COSTA RICA

By Stephanie Horvath

Keywords: Culinary Tours, Costa Rica, Nutrition

In June of 2009 I attended the Tropical Cuisine of Costa Rica course. The location was a small town outside of Tortuguera, Costa Rica for a 2-week course on the culture and cuisine of Costa Rica.

As students in the inaugural class of Tropical Cuisine: Costa Rica, we were exposed to several different experiences unique to Costa Rica. We visited a coffee plantation, and learned about the stages of a coffee bean, as well as picking procedures and distribution of coffee. We walked to a nearby chicken farm, where we were exposed to the different stages of chicken life, as well as the prosperity of the farm. We visited a dairy farm on two separate occasions, the first with an opportunity to milk Costa Rican cows, and on the second occasion, we observed and participated in the making of fresh cheese, to be used later used in our cooking. We even visited a papaya farm where we were graciously given guanabana and papaya, gifts from a very generous farmer.

We also learned about banana plantations, and how they're demand is causing the killing of rainforest. We discussed topics of "fast food" and "slow food" and watched the film, "Food, Inc." Along with our discussion of small farming and plantations, we were given a unique opportunity at the end of our trip, to plant a tree in the Costa Rican rainforest; an experience we all agreed was extremely memorable.

Each day was filled with learning about foods native and popular in the Costa Rican diet. We even got to experience the wildlife in our primitive living arrangements. We studied alongside a group of primatology students, so we had the privilege of observing howler and capuchin monkeys, as well as poison dart frogs, tropical birds, and several beautiful plant species.

At the end of the trip, we presented on the topic of the antioxidant properties of Costa Rican cuisine and teenage vitamin deficiency to our professors in Costa Rica as the culmination of our learning experience in Costa Rica.

THE RICHEST CRETACEOUS DECAPOD LOCALITY IN THE WORLD? – AN UPDATE

By Adiël A. Klompmaker

Keywords: coral Reefs, Crabs, Decapods, Diversity, Paleontology, Spain, Cretaceous

Today, many researchers are concerned about the decline in species richness on our planet. For example, on February 23th this year, a news article on the website Science reported that 75% of today's (species-rich) coral reefs are threatened right now. By 2050, all reefs will be in danger. This is potentially catastrophic for all species living in coral reefs, and possibly indirectly for species outside coral reefs because earlier research found that marine biodiversity was preferentially generated in reefs. One of the possible victims are decapods (crabs, lobsters, shrimp etc.).

Their biodiversity has changed tremendously during earth's history. My research focuses on what appears to be the richest decapod locality in the world for the Cretaceous period, 145-66 million years ago. The Koskobilo quarry is located in northern Spain, which was submerged about 100 million years ago when coral patch reefs dominated the area. Over time the reefs fossilized. In 2008, 2009, and 2010, I collected, together with a team of researchers, decapods from one of these patch reefs, the Aldoirar reef in which the Koskobilo quarry is located. Although research is still going on, at least 35 species can be confirmed, and about 20 are new to science. For comparison, other decapod-rich localities/areas known from the Cretaceous are Monte Orobe (northern Spain) with 23 species, Petréval (France) with 26 species, Devon (England) with 27 species, and Southern Limburg (The Netherlands) with 29 species. Thus, Koskobilo is indeed the richest Cretaceous decapod locality in the world. Remarkably, only crabs have been found; lobsters, shrimp and other decapods are absent.

Further research will attempt to explain this biodiversity peak of decapods in Koskobilo by studying the limestone rocks and decapods from in several sites within the Koskobilo quarry. Preliminary research suggests that several microenvironments existed in which different decapods thrived. A last step is to check the hypothesis that decapod diversity in the Mesozoic (251-66 million years ago) is, at least partly, driven by the abundance of (coral) reefs on earth. In other words: more corals reefs, more decapods. If this turns out to be true, it would imply that today's decapod biodiversity is under threat from a paleontological standpoint.

Fieldwork in Koskobilo was partly supported by a Graduate Student Senate (Kent State University) research grant, Sigma Gamma Epsilon (Gamma Zeta Chapter) research grant, Molengraaff Fonds, and an Amoco Alumni Scholarship to Klompmaker, and an NSF grant EF0531670 to Feldmann and Schweitzer.

CIRCADIAN GENE MODULATION AND BRAIN SITES OF ACTION IN ACAMPROSATE SUPPRESSION OF ALCOHOL INTAKE DURING RELAPSE

By Allison J. Brager

Keywords: Mper2, Circadian, Mouse, Alcohol, Acamprosate

Acamprosate is widely used to reduce ethanol craving and relapse in recovering alcoholics, but its central site(s) of its action are unknown. Here, we mapped brain areas sensitive to acamprosate suppression of ethanol intake and preference using stereotaxically-targeted acamprosate micropellets. The experiment was undertaken in PER2-mutant mice, which have elevated ethanol intake and craving compared to wild-types (WTs) as a partial consequence of their advanced phase-angle of entrainment and increased duration of wakefulness. Male mPER2 mutants and WTs under a 12L:12D (LD) photocycle were introduced to free-choice 15% ethanol/water for 3 wks. Ethanol was withdrawn and reintroduced 3 weeks later to facilitate relapse. Four days before ethanol reintroduction, mice received bilateral blank (control) or acamprosate-containing micropellets releasing 50 ng/day into reward (ventral tegmental [VTA], penduculopontine tegmentum [PPT] and nucleus accumbens [NAc]) and circadian (intergeniculate leaflet [IGL]; suprachiasmatic nucleus [SCN]) areas (n=6, each). The hippocampus was also targeted. Circadian locomotor activity was measured throughout using infrared sensors interfaced with a Clocklab data acquisition system. Baseline levels of ethanol intake and preference were greater in mPER2 mutants vs. WTs (27 g/kg/day vs. 13 g/kg/day and 70% vs. 50%, respectively; both $p<0.05$). In WTs, acamprosate implants in all areas except the hippocampus suppressed ethanol intake and preference by ~40% over 3-4 wk of reintroduction. In mPER2 mutants, acamprosate implants in the VTA, PPT, and SCN suppressed ethanol intake and preference by ~20% over 1-2 wk of reintroduction (all $p<0.05$ vs. blank implants). Overall higher levels of ethanol intake and preference were observed in the mPER2 mutants vs. wild-types throughout acamprosate treatment ($p<0.05$). All mPER2 mutants began their nighttime activity period ~2 hrs before that of wild-types ($p<0.05$), and alpha was extended by a similar duration ($p<0.05$). The acamprosate implants in the VTA and NAc that inhibited ethanol intake in wild-types produced a 300% increase in locomotor activity during the dark-phase of the LD cycle, but not in mPer2 mutants ($p<0.05$). Nighttime activity was increased by 200% in WTs and mPer2 mutants by acamprosate pellets in the SCN ($p<0.05$). Collectively, these results are evidence that the modulatory actions of acamprosate on ethanol intake, craving and circadian activity are manifest through its actions in multiple drug reward and circadian areas. The less robust suppressive effect of acamprosate on drinking in the PER2 mutants vs. WTs suggests that the mutant's innate drive to drink could render them less responsive to acamprosate. Individual differences in alcohol craving could thus be a factor determining the varying degree of clinical efficacy of this drug.

ASSOCIATING ASTHMA ADMISSIONS TO SYNOPTIC WEATHER TYPES IN NEW YORK STATE

By Cameron Lee

Keywords: Applied Climatology, Synoptic Methods, SSC, Weather Types, Asthma, Hospital Admissions, Morbidity

Previous climatological and epidemiological research has shown that there is a strong relationship between individual weather variables and asthma-related hospital admissions (ARHAs). This research takes a holistic view of the atmosphere in order to quantify this relationship by associating ARHAs to synoptic weather types comprised of a suite of weather variables that more aptly define the atmospheric situation to which an asthmatic is exposed. After correcting for seasonal, weekly, and time-series trends in ARHA data from the New York State Department of Health, the 0 to 6 day lags of Spatial Synoptic Classification (SSC) weather types are evaluated to assess their relationship to anomalous ARHAs and spike days of ARHAs in seven different regions of New York State from 1995-2006. Preliminary results generally agree with previous literature, suggesting that a cold and dry weather type – especially in autumn – corresponds to an increase in ARHAs 1 to 3 days after occurrence. Results from other regions and seasons vary considerably. This research will assist both public health officials and the general population in effectively preparing for high-risk days for asthmatics, and will help pave the way for future research looking into the impacts of climate change on asthma-related morbidity.

PALEOCLIMATIC CHARACTERISTICS OF LATE PLEISTOCENE/ HOLOCENE CARBONATES IN THE ARCTIC OCEAN BASED ON A PCA AND ELEMENT CORRELATION STUDY OF DOWNCORE XRF DATA

By Chandawimal Siriwardana

Keywords: Arctic Ocean, Paleoclimatic, PCA, XRF, Carbonates

Due to its sensitivity to global climatic variations, Arctic Ocean sediment deserves study as key evidence of past paleoclimatic events and to aid predicting future change. Terrigenous carbonate sedimentation in the Arctic Ocean is of particular paleoclimatic interest as it can be traced back to output from the Laurentide Ice Sheet. This material is primarily delivered by melt water fluxes and IRD and distributed by ocean/wind circulation. In the current study, 13 sediment cores recovered during the 2005 HOTRAX expedition across the Arctic Ocean provide coverage from the two main wind-driven circulation patterns: the Beaufort Gyre and Transpolar Drift. Varimax-rotated Principle Component Analysis of the downcore XRF analyses for 26 major/trace elements yields seven factors. The PCA results were compared with published late Pleistocene/Holocene core data of the region. The study identified factors presumably related to terrestrial sources (F1, enhanced Ti-K-Rb-Fe-Ba-Cr), changes in Laurentide Ice Sheet (F3, enhanced Ca-P-I), and Interglacial-interstadial environments (F6, enhanced Mn-Ni-Cu). Factors, F2 (enhanced Sn-Sb-Cd-Se-Ag), F4 (enhanced Fe-Mo-As-Co-Zn), F5 (enhanced P-Cl-S) and F7 (enhanced Sr-Zr) relate to various glaciomarine processes that will be discussed elsewhere. Downcore variations of the factors help to identify glacial-interglacial cycles and associated carbonate pulses. Enhanced Ca influx occurred during glacial/stadial periods as IRD and meltwater suspension, similar to Heinrich events in the North Atlantic. The detrital carbonate clast and clastic IRD records from JPC8 (Polyak et. al., 2009) are well correlated with corresponding F3 peaks measured in the same core. Mn-rich layers (F6 peaks) indicate interglacial/ interstadial periods and are generally anticorrelated with Ca pulses. As compared to the Beaufort Gyre, the Transpolar Drift Pleistocene sedimentation is characterized with only a few shallow carbonate spikes, which indicate low amounts of the Laurentide material in the Transpolar Drift.

PALEOCLIMATIC AND MINERALOGICAL CHARACTERIZATION OF DOWNCORE VNIR, VIS DSR AND XRF DATA FROM THE NORTHWIND RIDGE AREA IN THE CENTRAL ARCTIC OCEAN

By Chandawimal Siriwardana

Keywords: Arctic Ocean, Northwind Ridge, Late Quaternary, Marine Sediments, Near Infrared (NIR)

Visible-Near Infrared (VNIR) and Visible (VIS) Diffuse Spectral Reflectance (DSR) spectra and XRF data were studied from sediment core P1-92AR-P25 raised from the Northwind Ridge. With its proximity to the Laurentide Ice Sheet (LIS) margin, and enhanced sediment influx, the Northwind Ridge furnishes high resolution palaeoclimatic records providing insights into the interaction of the Beaufort Gyre and Transpolar Drift circulation patterns. The core is comprised of fine-grained sediments spanning from 0 to 190 ka (depth ~ 500 cm) marking onset of MIS 6 (Polyak et al. 2009).

The study demonstrates cyclic variations in downcore mineralogy. Varimax-rotated Q-mode factor analysis of the down core VNIR data show three mineral assemblages reflecting glacial–interglacial cyclicity. Results reveal that factor 1: smectite+ muscovite +chlorite assemblage (r = 0.83), increases during interglacial periods due to fluvial input and sea-ice drift from Pacific-Siberian sites. This factor is positive correlated with Mn, a proxy for basin ventilation. Factor 2, illite+quartz+geothite assemblage (r = 0.55) increases during glacial periods due to minerals that likely delivered to the site as melt water suspension from the LIS and/or wind activity. However, the relatively low-correlation of this assemblage with its inferred components indicates the influence of additional mineral phase(s) as yet to be determined. Factor 3, a dolomite+calcite+glauconite assemblage (r = 0.87) increases during deglacial times, delivered from the LIS as coarser detrital IRD and melt water pulses discharged along Alaskan slopes.

The results are consistent with XRF Mn and visible DSR data and clay mineral cycles identified by previous studies (Yurco et al. 2010). The downcore mineralogical cyclicity provides a glacial–interglacial portrait of changes in sediment provenance and delivery mechanisms associated with changes in sea level, configurations of Arctic ice sheets and oceanic/atmospheric circulation.

EXERCISE IN NORMOBARIC HYPOXIA EXACERBATES SYMPTOMS OF ACUTE MOUNTAIN SICKNESS BUT DOES NOT IMPACT MOOD STATE IN MIDDLE-AGED MALES

By Chul-Ho Kim

Keywords: Hypoxia, Symptoms, Exercise

Background: Research has demonstrated that hypoxia may elicit alterations in mood as well as cause acute mountain sickness (AMS). Exercise is a confounding factor which impacts the physiological responses to hypoxia.
PURPOSE: The purpose of the current investigation was to determine if low intensity exercise (50% of hypoxic VO2max) during normobaric hypoxia (12.5% O2) induces acute mountain sickness and mood changes in a middle-aged group.

Methods: Eight physically active (35.9 ± 5.7 ml·kg-1·min-1), middle-aged (40.5 ± 2 yr) males volunteered to participate in the present investigation. Prior to experimental testing, participants underwent a graded exercise test (Excalibur 1300Wcycle ergometer) to estimateVO2max in hypoxia. Following pre-experimental testing participants underwent two 5h trials [hypoxia (H) and hypoxia with exercise (H+E)] consisting of 2h baseline, 1h cycling, 2h recovery. All testing was conducted in a simulated hypoxia chamber (Colorado Altitude Training, Louisville, CO), and oxygen was maintained at 12.5%. Acute mountain sickness (LLS) and mood states (POMS) were measured prior to entering the chamber and five different time points (at 30min and every hr).

Results: For LLS, a mixed model analysis revealed that significant effect of time was observed ($p=0.002$), but no main effect of trials (H and H+E) by time (Pre-, 1, 2, 3, 4, 5hr) is observed ($p > 0.05$). However, an a-priori comparison of the change in AMS from 1hr post-exercise to 2hr post-exercise in the (H+E) and (H) condition demonstrated a significantly greater ($p=0.005$) increase in AMS scores in condition (H+E) (1 ± 0.82) than the (H) condition (-0.14 ± 0.34). For POMS, there is no main effect of time by trials observed in both negative mood component scores ($p > 0.05$) and total scores ($p > 0.05$).

Conclusion: These data suggest that low intensity exercise exacerbates symptoms of AMS during hypoxia but does not cause a differential response with regard to profile of mood state.

IMMIGRANT TERMS AND STOLEN IDENTITIES: UNPACKING NEW MEDIA'S POSITION IN RHETORIC AND COMPOSITION

By Courtney L. Werner

Keywords: New Media, Disciplinarity, Rhetoric And Composition, Sociology Of Science

This project traces the history of a rhetoric, composition, and writing studies as a discipline. As a new trend in rhetoric and composition research, new media acts as the lens through which this project understands the field's development. I use new media as a site of analysis to examine how particular elements of discipline and subdisciplines arise and evolve. This research is multilayered, then, inspecting not only how concepts and theories of new media function within rhetoric and composition but also investigating the growth and evolution of the discipline.

First, I define slippery terms (e.g. new media, modality, multimedia) in rhetoric and composition that are becoming more and more frequently used with less and less precise definitions. Parsing out the definitions held by the field moves the project toward research questions about disciplinary knowledge building.

To understand how contemporary disciplines develop, I study the artifacts most likely to affect the discipline's growth: textbooks and scholarly articles from the following four disciplinarily-foundational journals: College Composition and Communication, Research on the Teaching of English, Computers and Composition, and Kairos. I use citation indexing to identify key journal articles, which leads me to key textbooks used in the field. Finally, I analyze these texts with discourse analysis, specifically theories of ideational meaning and intertextuality, to identify trends in the development and evolution of rhetoric and composition especially in regards to theories of new media.

Unfortunately, because this is just the beginning of my research, I will present my proposed timelines and preliminary hypothesis as well as issues of methodology.

SQUAT LOBSTERS FROM THE LATE JURASSIC: 150 MILLION YEARS AWAY FROM YOUR DINNER PLATE

By Cristina Robins

Keywords: Paleontology, Fossils, Decapods, Galatheoids, Squat Lobsters

Galatheids, also called langostino lobsters or squat lobsters, have a long fossil history stretching back 150 million years from the Late Jurassic up to the present day. What is not understood is the evolutionary path they followed. It has only recently become apparent how diverse these organisms are. My MS thesis examined galatheids from one locality in Ernstbrunn, Austria (Robins, 2008). Previously, all the galatheids found there were assigned to two genera and a handful of species. Examining the previously unstudied specimens from Ernstbrunn that are housed in the Natural History Museum of Vienna, Austria, as well as material collected in the field, revealed 22 new species and 7 new genera, as well as a new family of galatheids. This is an incredible amount of diversity for one locality, especially since this is among the earliest recorded occurrence of galatheids in the fossil record. Prior to the Jurassic, no galatheids have been found. The purpose of my study is to examine specimens of galatheid squat lobsters to establish the rapid evolutionary pathways of these organisms. Comparing different types of galatheids from different locations and environments can illuminate their evolutionary past and provide clues about rapid evolutionary events in other organisms.

"In Accordance with the Best Traditions of American Democracy": The Institute of Arab American Affairs and the Palestine Question

By Denise Jenison

Keywords: Arab Americans, Palestine

The Institute of Arab American Affairs, established in 1944, was an Arab American group dedicated to introducing Americans to the Middle East. During the Palestinian debate, the Institute published prolifically, using rhetoric intended to resonate with an American audience. The language used can be broken into three types. The first, which I label the "friendly educator," assumes that Americans only side with the Zionist position due to ignorance of the Arab side, and gently contradicts this image by appealing to Americans' sense of fairness, justice, and democracy. Following the UN partition vote, the language shifts to one of betrayal and righteous anger. As the U.S. government begins to express its unease with partition, the language shifts again to Cold War rhetoric and attempts to tie Zionism with Communism. In contrast to the current historiography, this paper shows that Arab Americans were organized, politically active, and made their message heard.

FORGING CONNECTIONS BETWEEN CIVIL RIGHTS AT HOME AND THE CUBAN REVOLUTION: ROBERT F. WILLIAMS IN CASTRO'S CUBA

By Dwight Meyer

Keywords: Robert F. Williams, Cuban Revolution, Civil Rights

Robert F. Williams was a long-time advocate for Black Empowerment throughout the Civil Rights Era. During his tenure as the president of the local chapter of the National Association for the Advancement of Colored People (NAACP) of Monroe, North Carolina; Williams built the organization from a two man-chapter to what historian Timothy Tyson named as "the most vibrant, working class and militant chapter in the country."

This presentation will provide a snapshot of Williams's time in the United States and Cuba, from 1958-1965. During these years Williams used his powerful definition of self as a black citizen and especially his masculine ideals to advocate that African Americans deserved the rights of full citizens. These ideals clashed with the machismo ideology of the Cuban government but also diverged from the Socialist ideal that Marxism banished all issues associated with racism.

Despite his personal friendship with Fidel Castro, Williams felt threatened by certain factions within the government of the ongoing Cuban Revolution. His continued argument that race was an ongoing issue of concern in both the United States and Cuba proved problematic as this stance was "Counterrevolutionary." As the friction continued, Williams found his political voice silenced by the same Cuban government that had previously nurtured his Black Nationalist stances. In fear that he would be deported to the United States to stand trial for a crime he was later cleared of, Williams left Cuba in favor of China in 1965.

CAFFEINE TIMING AND CYCLING PERFORMANCE

By Edward Ryan

Keywords: Caffeine, Performance, Exercise

Research has demonstrated that caffeine ingestion improves physical performance. Caffeinated chewing gum is commercially available for consumption and the use of such products to enhance cycling performance may appeal to competitive cyclists. Stay Alert™ chewing gum (100mg caffeine/piece) offers a quick and effective delivery of caffeine via the buccal mucosa. **PURPOSE:** The purpose of the current investigation was twofold: 1) to determine if caffeine administered in chewing gum (Stay Alertä) enhances cycling performance, 2) to identify whether timing of administration impacts subsequent performance. **METHODS:** Eight male cyclists participated in five separate laboratory sessions, with a one week washout period between sessions. During the first visit, subjects underwent a graded exercise test on an Excalibur 1300Wcycle ergometer to determine maximal oxygen consumption (VO_{2max}) and were allotted time to practice the cycle time trial (TT). For each of the next four visits, 3 pieces of chewing gum [caffeine (CAFF) or placebo (PLA)] were administered at 3 time points, 120 min pre exercise (-120), 60 min pre exercise (-60), and 5 min pre exercise (-5). In 3 of the 4 experimental trials, CAFF was administered at one of the three time points and PLA at the other two time points. During the control trial (CON), PLA gum was administered at all three time points. The order in which participants completed the experimental trials was randomized. Following baseline measurements, time allotted for gum administration, and a standard warm-up, participants cycled at 75% VO_{2max} (constant Wattage) for 15 min then completed a 7 $kj \cdot kg^{-1}$ TT. **RESULTS:** A repeated measures ANOVA revealed a main effect for treatment ($p = 0.027$) in time to complete the TT. Post hoc t-test showed that TT performance was improved in -5 versus PLA ($p = 0.004$). **CONCLUSION:** A single dose of 300mg of caffeine administered in chewing gum enhanced TT performance when given at -5, but not when given at -60 and -120, relative to PLA.

NOTGELD AND NATIONAL IDENTITY: THE ROLE OF EMERGENCY MONEY IN POST-WWI GERMANY

By Erika Briesacher

Keywords: Weimar Germany, Material Culture, Emergency Money, Collecting, Culture

What does money mean to a culture? Most of the time, money is considered from a purely economic standpoint—as a mode of exchange and, proceeding from that, as an expression of class, status, and wealth. The tangible evidence of exchange—currency—can be analyzed by identifying and evaluating the images both by what they mean in a culture's unique code and what each image is supposed to accomplish. German Notgeld was a prime example of a currency that meant much more to its culture, symbolizing economic depression by its very existence while also being a vessel for the display of social imagery. Literally translated as "emergency money," Notgeld, issued by towns, firms, regions, and festivals, was a desperate way to halt inflation toward the end of World War I and throughout the 1920s. The fact that it was in circulation and also collectible simply reinforced the idea that imagery is important. Similar to the current United States State Quarter Collection, which includes figures iconic of each state's unique industry and culture, Notgeld imagery drew on regional pride and assured its place as collectible items of German culture. This study focuses on the societal, cultural, and material culture implications of symbolism on German Notgeld, and more specifically through Serienscheine (series notes). Each object tells a story: as a collector's item, as a reflection of postwar and Weimar Germany, and as an attempt to recast a fragmented heritage into a viable, cohesive, German identity.

CASE STUDY RESEARCH TECHNIQUES: OBTAINING ACCESS TO JAPAN'S NATIONAL PERSONNEL AUTHORITY (NPA) AND THE MIKE MANSFIELD FELLOWSHIP PROGRAM

By Franklin B. Lebo

Keywords: Case Study, Elite Japan, National Personnel Authority (NPA), Mike Mansfield Fellowship Program (MFP)

Obtaining access to an elite cadre of government officials is challenging regardless of the national context. Yet, there are certain techniques that may be employed by the researcher to mitigate those hurdles. Building trust, following government standard operating procedures, and providing clear descriptions to participants while adhering to IRB protocols are essential as the researcher uncovers the contours of the selected policy network and the attendant epistemic community.

This research project which evaluates the relationship between democracy and bureaucracy proved to be doubly challenging in these respects. Specifically, this project evaluates Japan's premier personnel agency, the National Personnel Authority (NPA), including its responsibility for managing government-to-government (G2G) relations with the United States through the congressionally authorized Mike Mansfield Fellowship Program. As such, this research presented unique challenges as rarely is the researcher faced with interviewing participants from two different governments,in this case the United States and Japan, who collectively represent multiple agencies and other representative government bodies.

This presentation will thus provide an overview of approaches that were employed for the past two years to facilitate this research process and gain the requisite access from telephone and in person interviews in the United States to traveling to Japan to conduct in person interviews with various officials in Kasumigaseki, Japan's government district, and elsewhere. Perhaps through this presentation other researchers may find inspiration when tackling their own sets of unique challenges.

ORDERED ARRAYS OF FTSZ, A BACTERIAL DIVISION PROTEIN

By James C. Redfearn

Keywords: FtsZ Ultrastructure Cytoskeleton

FtsZ is a protein found in bacteria, chloroplasts, and some mitochondria that is required for the proper replication of the organisms and organelles in which it is present. FtsZ provides both the structural scaffolding upon which the replication machinery is built and the force necessary for division to complete. Many models have been proposed describe the mechanism of force generation by FtsZ and all rely upon an array of FtsZ filaments that exhibit some long-range ordered structure. Prior experimental evidence suggests that this is the case; FtsZ filaments may associate in a tight helical bundle or as an array of overlapping linear filaments as little as one molecule thick. Here we present our findings on the optical properties of ordered arrays of FtsZ assembled in vitro.

THE USE OF SPARK-BASED NONTHERMAL PLASMA FOR STERILIZATION OF IN VITRO-CONSTRUCTED BIOFILMS

By James Ferrell

Keywords: Biofilms, Nonthermal Plasma, Fluorescence, Confocal Microscopy, Image Analysis

Biofilms are microbial communities that consist of one or more microorganisms growing in secreted exopolysaccharide matrices. Biofilms represent a separate bacterial growth cycle displaying altered physiological and metabolic characteristics. The development of biofilms is problematic in the medical setting in part because of their resistance to antibiotic chemotherapy. One possible alternative treatment is nonthermal plasma. Plasma is generated by the electrification of a localized gaseous environment , creating an emission of ionized particles, free radicals, and limited spectra radiation. We hypothesize that nonthermal plasma application to Staphylococcus aureus or Pseudomonas aeruginosa biofilms will reduce bacterial viability and alter cellular physiology characterized by direct cell counts, fluorescent staining, and confocal microscopy. Virulent strains of S. aureus and P. aeruginosa have been used to successfully construct in-vitro biofilms with a novel sequential reactor system. The bacteria in these constructs were then exposed to nonthermal plasma at variable doses. Bacteria in the biofilms were also stained with fluorescent viability and metabolic probes. Following exposure, the biofilms were imaged with spinning disc capture confocal microscopy. Stacks of images were then obtained and analyzed for biofilm structural characteristics. In addition, direct plating a cell counts provided additional quantitative data. Bacteria within biofilms exposed to nonthermal plasma displayed reduced viability characterized by plate counts and fluorescent microscopy. In addition, exposure zones on the bacterial biofilms displayed significantly different structural parameters compared with non-exposed areas. We can conclude that nonthermal plasma displays a germicidal effect in in-vitro constructed bacterial biofilms.

AVALANCHE FATALITIES IN THE WESTERN UNITED STATES: A COMPARISON OF THREE DATABASES, AND THE CREATION OF A POOLED DATABASE

By Jeremy Spencer

Keywords: Avalanches, Avalanche Fatalities, Natural Hazards, Risk and Vulnerability

The number of fatal avalanche reports in the United States has increased markedly during the latter half of the 20th century, a result of better reporting techniques and the rapidly increasing popularity of winter sports. This poster presents a comparison of three databases that record avalanche fatality-related information in the United States:Storm Data, the West Wide Avalanche Network (WWAN) dataset, and the National Avalanche Database (NAD). The frequency of avalanche fatalities, their spatio-temporal distributions, and the demographic characteristics of the victims were analyzed in each database for the years 1998-2009 for the U.S. mountainous west. The three databases were then pooled to arrive at a composite estimate of avalanche fatality frequency in the western United States for the study period. This research established that there is no single source that contains all reported avalanche fatalities in the United States. Therefore, the process of creating the pooled, composite database that addresses this concern will be described.

INFLUENCE OF TIME OF DAY ON THE LOCOMOTOR RESPONSE TO LIPOPOLYSACCHARIDE ADMINISTRATION IN MICE

By Jessica Murphy

Keywords: Circadian, Lipopolysaccharide

The suprachiasmatic nucleus (SCN) is integral for the regulation of circadian physiological and behavioral rhythms. Immune challenges have been shown to result in a suppression of behavioral rhythms, and previous work indicates that the time of administration of an immune challenge results in a varied physiological response of the circadian clock. High doses of Lipopolysaccharide, a bacterial toxin, result in differential mortality in mice depending on the time of day the toxin is administered. Our goal is to investigate the role of circadian clocks in mediating the brain‘s response to an acute inflammatory challenge such as that induced by LPS. Previous work from our lab has shown that a high, but sublethal dose of LPS resulted in an extended recovery period of the circadian locomotor activity rhythms as measured by voluntary wheel-running in the home cage. To quantify this response, we performed a dose-response study to assess the recovery period of this behavioral rhythm. Mice (C57BL/6J strain, both males and females) were housed in 12:12 light-dark (LD) cycle in cages equipped with running wheels and given injections of LPS (i.p.) at three dosages (1 mg/kg, 250 µg/kg, and 25 µg/kg) as well as saline vehicle alone three hours after lights on (zeitgeber time 3, or ZT3). Activity rhythms were monitored for a least a week prior to and following the injection. There were no fatalities from this challenge. There was a clear dosage effect on the recovery rate of the wheel-running rhythm. The lowest dose suppressed activity for only 1 cycle while the highest dose required approximately 5-6 days. To explore potential target sites in the brain for circadian modulation of sickness responses to LPS administration, animals housed in a 12:12 LD cycle were given i.p. injections of LPS (250 µg/kg) at ZT 3, ZT 11 and ZT 19 and perfused one hour later. Coronal sections of the brain were processed for c-fos immunohistochemistry. LPS induced increase c-fos expression in many regions of the brain, and clear differences in expression across circadian time were apparent. These data are currently being quantified to identify whether there are differential responses to LPS as a function of circadian time, in order to identify potential target sites for immune-system modulation of the circadian locomotor activity rhythm.

THE HISTONE DEACETYLASE INHIBITOR TRICHOSTATIN A AND L-METHIONINE INDUCE EPIGENETIC CHANGES IN THE ADULT CNS WHICH MAY BE UNDERLYING FACTORS IN THE PROGRESSION OF NEURODEGENERATIVE DISEASE.

By Jonathan Vadnal

Keywords: Epigenetics, Gene Expression, Microarray, DNA Methylation, Histone Acetylation, Neurodegenerative Disease

Environmental influences such as exposure to toxins, malnutrition, and oxidative damage, can play a role in modulating gene expression through epigenetic mechanisms such as histone modification, DNA methylation, and non-coding RNA synthesis. These mechanisms allow for the alteration of phenotype without altering genotype. A better understanding of which genes are regulated by epigenetic mechanisms may provide insight into the progression of diseases that lack a strong genetic basis or that may be influenced by unknown environmental factors. In the present study we investigated the role of two types of epigenetic modifications, acetylation and methylation, on gene expression in the adult brain by treating mice with the histone deacetylase inhibitor Trichostatin A (TSA) or L-methionine (Met). After one week of treatment with either TSA or Met, RNA was extracted from the brain cortices of mice and gene expression differences were analyzed by microarray profiling. TSA and Met treatments were shown to alter the expression of genes involved in inflammation, apoptosis, and neuronal signaling in the adult CNS. The altered genes were then compared with genes differentially expressed in neurodegenerative diseases through database and literature searches. Altered genes were found to overlap with differentially expressed genes in Alzheimer's Disease (AD) and Multiple Sclerosis (MS). These overlaps indicate that acetylation and methylation may be underlying factors in the development of neurodegenerative disease.

INDIRECT CATTAIL ERADICATION EFFECTS ON DECOMPOSITION IN A SEASONALLY DRY TROPICAL WETLAND

By Justin J. Montemarano

Keywords: Ecology, Freshwater, Carbon, Macrophytes, Wetlands

Within the wetland complex at Palo Verde National Park, Costa Rica, dominance by the native cattail Typha domingensis has prompted management efforts to reduce cattail coverage to facilitate migratory and resident waterfowl populations (e.g., Black-Bellied Whistling Duck). As a result, large areas of open water are created within the wetland complex that are colonized by a variety of macrophyte species, including the invasive water hyacinth Eichhornia crassipes.

Given that decomposition of plant material is an important source of energy and nutrients in freshwater wetlands, this study aimed to investigate indirect effects of cattail management on wetland plant decomposition dynamics by examining decomposition of Typha domingensis (TD) and Eichhornia crassipes (EC). 10-g of air-dried TD and EC litter in one of two states (freshly senesced and dry, dead litter from the previous wet season [past season]) was placed into 3-mm mesh plastic bags. Bags were attached to posts within one of two habitat types (open water habitat and Typha-dominated habitat [N = 5]), and decomposition bags from each litter type and habitat were collected 7, 14, 34, 76 and 134 d after initial placement. Upon collection, mass loss, changes in tissue chemistry (i.e., C:N, total phenolics, tannins, and lignins), and associated macroinvertebrate communities were determined. Decomposition rates were estimated by fitting the exponential decay model to mass loss data and examining litter species, litter state and habitat effects on the decay constant k.

Although no differences were detected in decomposition rates between habitat types, rates were reduced in TD litter compared to EC litter and were reduced for EC litter from the past season compared to freshly senesced litter; however, litter state had no effect on TD litter decomposition rates (litter species: $P = 1.4 \times 10^{-9}$; litter state: $P = 0.03$; habitat: $P = 0.86$). Patterns of lignin content correlated with decomposition rates, and may drive reduced decomposition rates in TD litter compared to EC litter. No differences were detected in macrophyte communities associated with decomposing litter by litter species, litter state or habitat, but diversity and abundance of macroinvertebrates decreased over time for all treatments. Removal of Typha domingensis has clear consequences for decomposition dynamics within the Palo Verde wetland. For example, litter may become depleted earlier in managed areas, where E. crassipes dominates, compared to in Typha-dominated habitat, where T. domingensis litter may remain as structure and a carbon source further into the season.

ADVANTAGES OF AUTOMATED METHOD FOR MAPPING LANDFORMS

By Dr. Kakoli Saha

Keywords: Glaciated Landforms, Map, Digital Elevation Model

The overarching goal of this research was to produce a method for automated identification and measurement of mid-scale landforms, specifically drumlins, from DEMs. Drumlins are typically smooth, oval-shaped hills or hillocks composed of glacial sediment, shaped by being overridden by the glacier. They were chosen because they have distinctive shapes, sizes, contexts, and textures that make them particularly recognizable compared to many other landforms. Also, drumlinized terrain has not been studied in this manner before (personal communication from Mike J. Smith), but rather by field mapping, which is simultaneously slow and expensive, has subjective biases, or by mapping from digital data that has primarily been used just to aid experts in visually locating and measuring drumlins. This is also time consuming. The building of an automated method is therefore highly desirable and can help researchers map drumlins, and just about any other landform that has recognizable parameters that can be highlighted as input to the automated process.

ELUCIDATING THE PATHWAY OF APATONE® INDUCED DNASE II REACTIVATION DURING AUTOSCHIZIC CELL DEATH

By Karen McGuire

Keywords: Cancer, Cell Biology, Apatone, Cell Death, Autoschizis, DNase II

Introduction: Apatone® (Vitamin C (VC) and vitamin K3 (VK3) administered in a 100:1 ratio) exhibited potent antitumor activity against human cancer cell lines in vitro and in vivo by inducing auotschizic cell death. Autoschizis entailed the inhibition of the transcription factor NF-κB by Apatone which is followed by a cascade of processes that culminate in the sequential reactivation and release of DNase I and DNase II. DNase II is present in an inactive 1:1 complex with elastase and DNase II and is believed to be cleaved by cathepsins from the lysosomes into two active enzymes during cell death. Since, NF-κB is also involved in stabilizing the lysosomal membrane, we hypothesize that Apatone-induced reduction in tumor cell levels of NF-κB trigger destabilization of the lysosomal membrane and the release cathepsins, DNase II and other lytic enzymes which participate in autoschizis.

Methods: A microtetrazolium (MTT) assay was employed to evaluate Apatone induced tumor cell death. Light microscopy and Scanning and Transmission Electron Microscopy were employed to study the ultrastructural changes in the lysosomes and other compartments of the tumor cells. Fluorescence microscopy, fluorescent bioassays and immuno-histochemistry were employed to coroborate lysosomal changes and monitor changes in DNase and cathepsin distribution and activity.

Results/Discussion: The MTT assay demonstrated synergistic cytotoxicity by VC and VK3 against the DU145 prostate cancer cell line. Electron microscopy confirmed that tumor cell death was due to autoschizis. Over the course of 1h of Apatone treatment, acridine orange assays and electron microscopy revealed increased permeabilization of the lysosomes which was corroborated by increased cathepsin B and L and increased DNase II activity. These results confirm the importance of lysosomal permeabilization and DNase II reactivation in Apatone-induced Autoschizic tumor cell death.

NATURE OF FERMI SYSTEMS NEAR L=0 POMERANCHUK INSTABILITY: A TRACTABLE CROSSING SYMMETRIC EQUATION APPROACH

By Kelly Reidy

Keywords: Condensed Matter Physics, Correlated Electrons

In Fermi liquids, a Pomeranchuk instability occurs when one of the Landau parameters approaches -(2l+1). Depending on which Landau parameter is involved, these Pomeranchuk instabilities can be related to a ferromagnetic transition or to a density wave or charge instability resulting in phase separation. We use the tractable crossing symmetric equations (TSCE) method to explore the nature of quantum fluctuations, excitations and pairing in a 3D Fermi system, around these points. We obtain interesting limiting results at zero and finite momentum (q), and in the limits of large and small coupling strengths. We develop methods to deal with a set of finite-q singularities in the competing quantum fluctuation terms contained in TSCE; these may have physical significance. Using graphical and numerical methods to solve coupled non-linear integral equations that arise in the TSCE scheme, we obtain results for the behavior of spin and density excitations, and pairing properties around the instability points. Our results may have relevance to ferromagnetic superconductors.

TRANSCRIPTIONAL REGULATION OF VEGF BY WT1 AND AR IN PROSTATE CANCER

By Kurtis Eisermann

Keywords: Prostate Cancer, VEGF, Androgen, AR, WT1

Identifying molecular mechanisms that influence prostate cancer progression is central to understanding how this disease develops. Angiogenesis is key for cancer development and growth as tumors require new blood vessels for nutrients and oxygen. Vascular endothelial growth factor (VEGF) is the most important signaling protein involved in angiogenesis and is up-regulated by oncogene expression among other things. Previous studies have shown that the zinc finger transcription factor WT1 transcriptionally regulated VEGF in multiple cell lines. Additionally, WT1 activation of VEGF required an intact zinc finger domain and was mediated by DNA binding. Potential WT1 binding sites were identified in the VEGF promoter using in silico approaches and shown to bind WT1 protein using EMSA and ChIP assays. Luciferase reporter assays showed increased activation of the VEGF promoter by over-expression of WT1. Additional factors known to induce VEGF expression are growth factors, hypoxia and hormones. How androgen regulates VEGF transcription is unknown but we have identified two potential AR binding sites within 2kb of the transcriptional start site and demonstrated reporter activation by R1881 treatment of transfected LNCaP cells. This study examined the effect of mutating selected WT1 and AR binding sites in the VEGF promoter to determine whether they were responsible for activation of VEGF transcription. Mutating these binding sites by site-directed mutagenesis significantly decreased activation of the VEGF promoter by WT1 and the androgen analog R1881 in LNCaP cells. As predicted, treatment with the anti-androgen casodex similarly eliminated hormone response of the VEGF promoter, suggesting that androgens are functioning via androgen signaling. This was confirmed in vivo by both western blot analysis of VEGF protein and quantitative real-time PCR measurement of VEGF mRNA in cells treated with casodex. Overall these results show that both WT1 and AR transcriptionally regulate VEGF expression in prostate cancer cells and these factors directly bind and activate the promoter in vivo. This is important because androgen signaling is vital to normal prostate development and malignant prostate growth. Thus, understanding how angiogenesis is controlled and regulated will hopefully lead to improved ways to treat and prevent prostate cancer progression.

ARTICULATING ARGUMENT IN DOCUMENT DESIGN

By Lindsay Steiner

Keywords: Rhetoric, Composition, Document Design, Argument, Multimodality

Researchers of document design and multimodality have suggested that both the form and content of a text are important contributors to meaning (Kress and Van Leeuwen, 1996; Kostelnick & Hassett, 2003; Schriver, 1997). Despite these and other scholars' focus on design and form, there is an implicit privileging of the content (what is said) and of the print-linguistic elements of a text in our field. The form, or design, is implicitly considered as secondary to the content in contributing to a text's meaning. Due to the oft-contested and vague understanding of "meaning," I will substitute the term with "argument" in order to provide this study with a stronger connection to the field of rhetoric and composition. There is plenty of scholarship that addresses the semiotic and rhetorical functions of visual modes, but less scholarship that addresses any connection between document design (Schriver) and argument. In addition, much of this scholarship focuses on the texts and not the design practices and the designers themselves. This research is a step towards connecting the theoretical and empirical grounding of the elements of argumentation conveyed in both form (design) and content. In addition, I also want to know what document design can tell us about alternative forms of composing.
This project focused on addressing the following research question: How do document designers articulate qualities of arguments through the design of a text?

THE IMPACT OF TYPHA ANGUSTIFOLIA AND PHRAGMITES AUSTRALIS INVASIONS IN WETLANDS ON BEHAVIOR OF LARVAL AND ADULT RANA CLAMITANS

By Lisa Regula Meyer

Keywords: Invasive Plants, Amphibians, Behavior, Wetlands

Invasive plants often have chemical components to which many native amphibians are naïve, and change the structure of the entire habitat by rapidly establishing a dominance of a single species, thus reducing habitat complexity. Invasive plants threaten amphibians and other wetland organisms, more so than they threaten fully terrestrial organisms for a number of reasons. This study compares the behavior of Rana clamitans tadpoles in a swim T-maze when presented with the invasive plants Typha angustifolia or Phragmites australis, the native plant Juncus effusus, or no plant. Individuals were caught in ponds without the plants in question, and are assumed to be naïve to chemical cues from these plants. The ability to recognize and avoid unknown and possibly dangerous chemicals would be advantageous to larval amphibians, which are sensitive to numerous chemical and physical factors. The behavior of adults caught from similarly non-invaded ponds was also investigated using a 1-meter diameter arena with one third each T. angustifolia, P. australis and native plant mix. Samples of plant communities were obtained from the shores of previously studied wetlands, which have been used for three years of data collection on invasive plants. Differences in behavior based upon different plant communities may prove important for amphibians, especially if there is significant difference between invaded and non-invaded plant communities. Despite the preservation of total wetland area via no-net-loss policies, if the preserved wetlands are dominated by invasive plants, the net effect for amphibians may be negligible.

ELASTIC CONSTANTS AND ORIENTATIONAL VISCOSITIES OF A BENT-CORE NEMATIC LIQUID CRYSTAL

By Madhabi Majumdar

Keywords: Elastic Constant, Viscosity, Dynamic Light Scattering, Freedericksz Transition, Bent-Core Nematic, Clusters

Using a combination of dynamic light scattering and Freedericksz transitions induced in applied magnetic and electric fields, we have determined the absolute magnitudes of the Frank elastic constants and effective orientational viscosities of the bent-core nematic liquid crystal, 4-chloro-1, 3-phenylene bis 4-[4'-(9-decenyloxy) benzoyloxy] benzoate. At a fixed temperature 2oC below the isotropic-nematic transition, we find: K11=3.1×10-12 N, K22=0.31×10-12 N, K33=0.88×10-12 N, ηsplay=1.1 Pa S, ηtwist=0.37 Pa S and ηbend=1.2 Pa S. Our result shows that the orientational elastic constants of the BCN studied are significantly lower (particularly K22) than those of typical calamitics (5CB) [1] and that K11>K33>>K22. A dramatic enhancement of orientational viscosities (4 to 100 times larger than calamitics) was also confirmed in BCNs. The unusual anisotropies of these parameters are discussed in terms of a nematic containing molecular clusters exhibiting short-range smectic-CP-type correlations. Acknowledgment: This work was supported by the Grant NSF DMR-0606160 and DOE Grant no. DE-SC0001412.

References

[1] G. P. Chen, H. Takezoe and A. Fukuda, Liq. Cryst., 5, 341 (1989)

FLUCTUATION MODES OF A BENT-CORE NEMATIC LIQUID CRYSTAL

By Madhabi Majumdar

Keywords: Bent-core, Biaxial, Twist-bend, Hydrodynamic.

We present a dynamic light scattering study of the bent-core nematic liquid crystal compound DT6Py6E6. We utilize a "dark" scattering geometry, which allows us to search for fluctuation modes that are not purely associated with the uniaxial director. Indeed, we observe two modes (hydrodynamic and non-hydrodynamic) in addition to the expected twist-bend director mode. We present a model for the additional modes based on fluctuations of the biaxial order parameter, which leads to an estimate of 10-100 nm for the correlation length associated with these fluctuations.

STEREOTYPE PROCESSING'S EFFECT ON THE IMPACT OF THE MYTH/FACT MESSAGE FORMAT: THE ROLE OF PERSONAL RELEVANCE

By Marie A. Yeh

Keywords: Attitudes, Stereotypes, Automaticity, Perceived Learning, Mental Illness

This study examines the myth/fact message format (MFMF) within the social marketing context of mental illness (MI). People with MI are stereotyped and stigmatized such that many social marketing efforts have been pursued to change widely held negative misperceptions. One method used to counter these misperceptions is the myth/fact message format, which frames the message by first stating the myth, the incorrect viewpoint, followed by the counter viewpoint labeled as fact. The use of MFMF in the context of MI includes countering aspects of the stereotype that surrounds the ailment. It has been well documented that stereotypes, as well-learned beliefs about the characteristics, attributes and behaviors of members of certain groups, are automatically activated in the presence of a group member; however, those motivated to do so, can intentionally inhibit the stereotypes' automatic retrieval. This suggests that the use of the MFMF, which explicitly expresses a negative aspect of the stereotype, would automatically trigger the stereotype and subsequently strengthen its association. By repeating a well-learned association within one's stereotype of people with MI, one further strengthens that association, thereby weakening the following fact's ability to discount that negative view. Conversely, utilizing a fact only, rather than the MFMF, should instantiate a new positive belief without reinforcing the stereotypical view.

320 students from a large Midwestern university were surveyed in a 2 x 3 factorial design with message format (myth/fact vs. fact) and number of messages (1,3 or 5) manipulated between subjects. Personal relevance (PR) with MI was measured. As no differences were found on the number of messages, analysis was collapsed across number of repetition cells. Attitudes towards MI as measured by a scale created for the study and perceived learning about MI scale were dependent variables.

The differential impact of the myth/fact versus fact only message format on attitudes towards MI was demonstrated; specifically, a fact only appeal was more effective in engendering desired behavioral and attitudinal responses. This effect, however, was moderated by PR with MI with those high in PR reported more unfavorable attitudes under myth/fact than under fact only; those low in PR showed no difference. PR also impacted perceived learning differently than attitudes such that those low in PR reported higher levels of self-reported learning than those high in PR.

We suggest that those for whom the issue of MI is personally relevant processed the message via the central route devoting the cognitive effort towards its evaluation while those for whom the issue was irrelevant did not process the information adequately for the format to matter. In addition, those with PR with MI had an existing cognitive schema of nonstereotypical beliefs which was reinforced by the fact only message while the inclusion of the myth reinforced the negative stereotype. Findings suggest that while the MFMF may be more effective in enhancing people's perception of learning, its effects on attitudes may be the opposite. Social marketers should carefully consider the goal of acampaign before deciding to use the MFMF.

VALUE RELEVANCE OF INNOVATION IN THE PHARMACEUTICAL INDUSTRY

By Mary Schramm

Keywords: Value Relevance; Innovation; Strategy; Research & Development; New Products

During the past three decades, the pharmaceutical industry has increased its reliance on incremental innovation to drive growth. This change in conduct reflects the industry's response to a series of changes that has negatively impacted the return on its research and development investment. This dissertation examines the relationship between these changes in conduct and financial performance. First, the structure-conduct-performance paradigm and the resource-based theory of competitive advantage are referenced to establish the basis for the dynamics of change at industry and firm levels. Then, a value relevance model is defined to study the relationship between the change in innovative focus and the change in financial performance.

This research studies the brand name pharmaceutical industry from 1980 to 2009. Data to study the relationship between innovative focus and performance are compiled from three sources. Financial data are drawn from Standard & Poor's Compustat database and firms' annual reports. Data to operationalize innovative focus are acquired from the United States Food and Drug Administration's drugs@fda.gov database. The value relevance model defined for this research is evaluated using time series and pooled time series approaches.

The results confirm that the pharmaceutical industry's innovative focus changes significantly during the period studied. The change in innovative focus significantly drives change in financial performance. Closer analysis of strategic change at the firm level reveals that some firms increase their focus on incremental innovation while others do not. Financial performance changes only for the firms that increase their focus on incremental innovation. In the long run, the financial performance of the firms that change strategy by increasing their focus on incremental innovation exceeds that of the firms that do not. This research contributes to the value relevance literature by examining allocation of the research and development investment, rather than the magnitude of the investment, and its role in driving financial performance. The results from this research have important implications for managers as they set new product portfolio strategy to drive superior financial performance for their firms.

DIFFERENTIAL PRESENTATIONS BETWEEN CORTICAL AND WHITE MATTER DEMYELINATION PATHOLOGY IN ATYPICAL MULTIPLE SCLEROSIS BRAINS

By Megan Hendrickson

Keywords: Gray Matter, Multiple Sclerosis

Multiple Sclerosis (MS) is a disease of the central nervous system, with focal inflammatory demyelination. White matter lesions are the hallmark of MS, which can be visualized in vivo using magnetic resonance imaging (MRI) over the entire disease course. White matter lesions are also identified macroscopically on post mortem tissue by the discoloration of the lesion relative to surround white matter, due to the loss of the iridescent myelin which gives the tissue its white appearance. There is not a strong correlation between white matter lesions and the neurological disability in many MS patients. Atypical MS brains show no hemispheric white matter lesions, but still presented with neurological disabilities to deserve the MS diagnosis. Gray matter pathology is also found in the MS patients, and at times exceeding that of the white matter pathology. Although some gray matter lesions can be observed, most cortical lesions are not visible macroscopically or by standard MRI, for reasons that include the relatively little inflammation associated with these lesions and the relatively low myelin content of the cortex. At present, cortical gray matter lesions are detected only by immunohistochemistry. To study the possible cortical gray matter pathology in atypical MS brains to explain the disability in these patients; we examined over 100 MS brains received from the rapid autopsy program at the Cleveland Clinic. Fourteen of these brains feature few white matter lesions (less than 2) when observed macroscopically. In these fourteen MS subjects and 8 age-matched non-neurologically diseased controls, brain and spinal cord regions were immunohistochemically stained for a variety of markers that identify tissue inflammation and MS pathology. Five predetermined cortical regions, two deep grey matter regions and four locations on the spinal cord were analyzed. Gray matter type II (small perivascular lesions confined to the cortex) and type III (extend from the pial surface to cortical layer 3 or 4) lesions were found in all 14 MS brains, and none were seen in the 8 control brains. Another pathology common to all of the 14 MS brains was a decreased density of the myelin stain (defined as myelin thinning), which was significantly more pronounced than in the control brains. The cortical lesion and myelin thinning pathologies were most commonly found in the cingulate gyrus and the insular cortex. While some thinning was seen in the non-neurologically diseased controls, this could be contributed to the advanced age of the control brains. Remyelination was also a significantly more common occurrence in the MS brains as compared to controls. Microglial activation was observed in both MS and control brains. However some of the locations and patterns of microglial activation were specific for the MS brains as compared to the controls. To conclude, this study demonstrates that gray matter pathology may be significant in atypical MS brains with few white matter lesions. These findings suggest that the absence of a strong correlation between in vivo MRI metrics of white matter lesion burden and disability in MS patients may be due to a significant burden of gray matter pathology that is undetectable in vivo by MRI.

MODULATION OF TRANSIENT RECEPTOR POTENTIAL CATION CHANNEL, SUBFAMILY A, MEMBER 1 (TRPA1)ACTIVITY BY CDK5

By Michael A. Sulak

Keywords: Nociception

The overall goal of this investigation is to identify the role of cyclin-dependent kinase 5 (Cdk5) in the modulation of transient receptor potential cation channel, subfamily A, member 1 (TRPA1) activity in sensory neurons. Our understanding of the molecular mechanisms for pain and temperature sensation has undergone a revolution in the last dozen years through the characterization of receptors of the Transient Receptor Potential (TRP) superfamily. TRP receptors, non-selective cation channels with polymodal sensitivities, have emerged as key 'molecular machines' for sensation of diverse stimuli, including: noxious and innocuous cold and heat, pungent chemicals such as capsaicin, thymol and menthol, mechanical force, and tissue acidification in an inflammatory milieu. TRPA1, the only member of the TRPA family found in mammals, is a polymodal ion channel expressed in small-diameter, nociceptive neurons of the dorsal root ganglia (DRG), the activation of which has been linked to both acute and inflammatory pain. A detector of chemical damage, TRPA1 can be activated by a large number of 'irritating' compounds – the list of TRPA1 agonists has been growing at a rapid rate, with nicotine, ozone and the intravenous anesthetic, propofol, included among recent additions. Along with its role in acute nociception, TRPA1 also acts as a detector of inflammatory signals. Tissue damage and inflammation lead to peripheral sensitization, a state of altered physiology in which sensory neurons display increased responsiveness and a reduced threshold of activation.

An array of signaling molecules released in damaged tissues, including prostanoids, chemokines, purines, growth factors, amines, protons, kinins and proteases, make up the 'inflammatory soup,' which is implicated in peripheral sensitization. The resulting allodynia and hyperalgesia, which have been linked to TRPA1 activation, are believed to play causative roles in the onset of chronic pain disorders. While ligand activation of TRPA1 has received considerable attention, the molecular regulation of TRPA1 activity has been less carefully scrutinized. Phosphorylation of TRPA1 residues as a mechanism of regulation has yet to be documented, in marked contrast to TRPV1, the best studied TRP channel, which is known to undergo phosphorylation by multiple kinases.

Cdk5, an unusual member of the cyclin-dependent kinase family which is principally active in post-mitotic neurons, has recently emerged as a key modulator of pain signaling pathways. Pain-associated molecular targets of Cdk5 phosphorylation include TRP channels of the vanilloid receptor subtype 1 (TRPV1) and delta opioid receptors. This investigation tests the hypothesis that Cdk5 modulates the activity TRPA1, a nociceptive mediator of increasingly recognized importance.

COGNITIVE RESERVE MODERATES THE ASSOCIATION BETWEEN HEART FAILURE AND COGNITIVE IMPAIRMENT

By Michael L. Alosco

Keywords: Heart Failure; Cognitive Reserve; Cognitive Function

Objective: Heart failure (HF) affects more than 5.7 million Americans. Persons with HF exhibit cognitive impairment in multiple domains, including attention, executive function, memory, and psychomotor speed. Cognitive reserve theory suggests that premorbid factors, such as intellectual ability, provide a buffer against cognitive impairment, contributing to cognitive variability in individuals with similar neuropathological insult. Cognitive reserve moderates cognitive changes in persons with conditions such as Alzheimer's disease and traumatic brain injury, though no study has examined this possibility in persons with HF.

Participants and Methods: Persons with HF (N = 157; 69.26±9.26 years; 39% female) completed neuropsychological testing and a fitness assessment. For the current study, cognitive reserve was operationalized as estimated premorbid IQ from the American National Adult Reading Test (AMNART). Neuropsychological testing included commonly-used measures of attention, executive function, memory, and language. The 2-minute step test (2MST) provided an estimate of fitness and was used as a proxy for HF severity.

Results: A moderation analysis was performed using a multiple linear hierarchical regression model for each cognitive domain. All raw scores for the predictor variables were transformed to t scores using normative data and a composite score calculated for each cognitive domain. An interaction term between the AMNART and 2MST was created to determine if a moderation effect was present. Participant age, gender, and depression were entered in the first block. The 2MST was entered into the second block and AMNART was entered in block three. The fourth block contained AMNART X 2MST interaction. The AMNART showed incremental predictive validity over demographic variables, and 2MST for attention (R^2 change = .13, $p < .001$), executive function (R^2 change = .17, $p < .001$), language (R^2 change = .32, $p < .001$), and memory (R^2 change = .04, $p < .05$). Furthermore, the interaction term was significant for attention ($t(155) = -2.66$, $p < .01$), executive function ($t(155) = -3.13$, $p < .01$), and language ($t(155) = -2.69$, $p < .01$.

Conclusion: The current findings suggest that cognitive reserve moderates the association between HF severity and cognitive function for attention, executive function, and language. In each case, higher estimated IQ attenuated the adverse impact of HF on cognitive function. The mechanisms by which cognitive reserve attenuates cognitive impairment in this population are unknown and prospective studies should examine the possible contribution of neural reserve and neural compensation.

CLOSTRIDIUM DIFFICILE AND TOXIN RECOVERY FROM FECES PRESERVED WITH ETM

By Michael Shilling

Keywords: Clostridium Difficile, Preservation, Transport, Toxins, Laboratory Testing

Transportation of fecal samples for rapid and accurate detection of Clostridium difficile disease by clinical microbiology laboratories is an ongoing problem. Environmental conditions may have adverse affect on C. difficile toxins and antigens for detection. Inaccurate tests results may lead to serious patient consequences from untreated C. difficile infection. Varying test specificity and sensitivity also leads to repeat testing and empiric therapy decisions that increase the cost of patient treatment. Ninety-eight patient fecal samples from patients with the differential diagnosis of C. difficile diarrhea were diluted in Enteric Transport Media (ETM) to establish its ability to preserve toxin antigens for detection by EIA. The following tests were used in this study: ProSpec T C.difficile Toxin A/B, Clostridium Difficile kit, C. Diff Quik Chek, C. difficile culture by alcohol shock method, and fecal pH. All samples (excluding Cell Cytotoxin testing) were diluted in (ETM) before testing. Fourteen percent of the samples submitted tested positive for toxin by EIA, with 93% of the samples remaining positive after 5 days while preserved in ETM at room temperature.

FRIENDSHIP, LOVE, AND SEXUAL PARTNERS: MOTIVES FOR CREATING CYBER RELATIONSHIPS

By Molly Taggart

Keywords: Friendship, Love, Sexual Partners, Interpersonal Communication, Motives, Cyber Relationships, Online/Internet Dating, Online Dating Websites

"Twenty years from now, the idea that someone looking for love without looking for it online will be silly, akin to skipping the card catalog to instead wander the stacks because 'the right books are found only by accident.' Serendipity is the hallmark of inefficient markets and the marketplace of love, like it or not, is becoming more efficient" (Wired Magazine, 2002, p.2).

Following the concept of diffusion of innovations, online dating continues to gain popularity as it becomes more widespread. A recent poll of almost 11,000 internet users throughout 19 countries showed that online dating is increasing in acceptance and becoming less obscure and more mainstream. Where is a good place to find a boyfriend or girlfriend? Find them on the internet, say 30 percent of internet users who agreed according to a poll conducted by GlobeScan for BBC World Service (Hussain, 2010).

Recently a four stage empirical research study was published which further helped explain the motives for a very specific type of interpersonal communication – the creation and development of cyber relationships. This scale, created by Wang and Chang proposed nine different reasons, or motives, for why people want to use the internet to create a new relationship (2010, p. 290). The nine motives are: anonymity (Cronbach's Alpha = .77), the opportunity to meet new people (.66), easier communication (.83), curiosity (.85), emotional support (.78), social compensation (.84), away from the real world (.91), love (.94), and sexual partners (.98). The nine motives were grouped into three dimensions: adventure, escape to a virtual world, and romance.

MODELLING SMECTIC LAYERS IN CONFINED DOMAINS

By Mykhailo Pevnyi

Keywords: Liquid Crystal, Smectic, Confined, Modeling

The influence of the surface on smectic liquid crystal configuration in a bulk has been a subject of intense investigation for many years. The results of experimental research on liquid crystal colloids were published recently, reporting the layered structures of liquid crystals in colloidal particles [1]. This inspired us to develop an approach for modelling smectic layers in confined nanoscale domains. We have done this calculation by simulating the nematic – smectic A phase transition.

The standard approach to describe the nematic – smectic A transition was suggested by P.-G. de Gennes [2] and is applicable for small director deviations from homogeneous alignment. The complex smectic order parameter ψ is introduced there. According to that theory the free energy functional is F_NA=∫▒〖d^3 x{r|ψ|^2+u/2 |ψ|^4+C|(∇-iq_n δ"n" _⊥)ψ|^2+f_elastic } 〗. (1) An intuitive way to extend that theory for the case of an inhomogeneous director field would be to use the following free energy functional F=∫▒〖d^3 x{r|ψ|^2+u/2 |ψ|^4+C|(∇-iq"n")ψ|^2+f_elastic } 〗. (2) Although this model gives a good approximation for a nearly homogeneous director it has one significant limitation: the model gives a free energy difference between the director "n and –n" , whereas the real physical system has a symmetry between "n and –n" . Thus, this model is appropriate for a transition between the polar nematic and polar smectic phases, but not for the conventional nonpolar nematic – smectic transition.

To preserve the symmetry of the nematic and smectic phases we suggest using the real density modulation δρ as the smectic order parameter. The coupling term in the free energy must then be [(∂_i ∂_j+q^2 n_i n_j)δρ]^2, which is independent of the sign of "n" . The free energy functional now takes the form F=∫▒〖d^3 x{aδρ^2+b〖δρ〗^3+c〖δρ〗^4+B[(∂_i ∂_j+q^2 n_i n_j)δρ]^2+f_elastic } 〗. (3) For the special case of homogeneous director alignment, this model leads to a sinusoidal density wave, as in the de Gennes theory. However, the advantage of this model is that it can be used for an arbitrary nematic director configuration as well.

In this work, we use the two theoretical approaches to model the nematic – smectic transition in simple two-dimensional domains. We numerically minimize the free energy of Eqs. (2) and (3) subject to boundary conditions of different types, and determine the configuration of the smectic layers. We compare the theoretical results with experiments on smectic liquid crystals in nano-colloidal particles.

Acknowledgment: We would like to thank B. R. Ratna for helpful discussions. This work was supported by NSF Grant DMR-0605889.

References

[1] C. M. Spillmann et al., Langmuir 25, 2419-2426 (2009).
[2] P. G. de Gennes and J. Prost The Physics of Liquid Crystals, Oxford University Press, 1993.

ARGENTINA'S EMERGENCE INTO THE CORE RUGBY REALM

By Nick Wise

Keywords: Rugby, Core and Periphery, Place, Argentina

The sport of Rugby Union takes on different meanings around the world. In this study, we take a unique approach to add to the literature on sports geography by focusing on a country (Argentina), and a sport (rugby), that together have received little attention to date. This work critically assesses the place of Argentina within the global rugby setting and attempts to tease out some of the key issues surrounding core and periphery in international Rugby Union. Throughout this research, several conceptual diagrams are introduced to conceptualize the place of Argentina spatially. These will be supported with primary media sources to illustrate the place of rugby domestically and internationally. Argentina's recent invitation to join a proposed Four-Nations competition (to commence in 2012) situates the Pumas as an emerging rugby nation, positioning the country as a challenger to the eight core rugby nations.

PPP1CC GENE PROMOTER IS TESTIS SPECIFIC AND FUNCTIONS TO MAINTAIN PP1Γ1 AND HIGH LEVELS OF PP1Γ2 IN SERTOLI CELLS AND TESTICULAR GERM CELLS, RESPECTIVELY FOR NORMAL SPERMATOGENESIS

By Nilam Sinha

Keywords: Phosphatases, Gene Expression, Promoter, Gene Regulation, Male Fertility.

In mammals the four PP1 isoforms, PP1α, PP1β, PP1γ1 and PP1γ2, are encoded by three genes, namely Ppp1a, Ppp1b, Ppp1cc. The isoforms PP1γ1 and PP1γ2 result from differential splicing of Ppp1cc gene. The PP1 isoforms are virtually identical (approximately 90% identity) except at their extreme C-termini. Elimination of Ppp1cc gene in mice, which eliminates both PP1γ1 and PP1γ2 expression, results in male infertility due to impaired spermatogenesis –suggesting for an indispensible role for the proteins in male fertility. Mutant female mice are fertile and appear normal suggesting that PP1α, PP1β, can substitute for the loss of the PP1γ isoforms in all tissues except testis in-spite of high degree of sequence homology. Interestingly however any of the four mammalian isoforms can complement yeast lacking its sole endogenous PP1. The present study is focused to understand the specific distribution and abundance of the PP1γ isoforms and how that be related to their function within the testis in spermatogenesis and sperm development. We attempted to answer this question by looking into the temporal expression pattern of the PP1 isoforms in the testis. The data presented clearly show that PP1 isoform expressions are regulated in developmental stage specific manner suggesting for a non-overlapping function in adult testis. The above results for the first time suggested a role of Ppp1cc gene promoter in maintaining testis specific expression. Finally in our attempt to test the promoter specificity in-vivo we used the endogenous promoter of the PP1γ1 gene identified as a 2.6 kb fragment upstream of start site to drive over-expression of full length PP1γ2 c-DNA. Our results conclusive prove that the Ppp1cc gene promoter is testis specific and successfully able to restore testis specific expression of the PP1γ2 isoform. Spermatogenesis was fully restored in transgenic mice expressing PP1γ2. Significantly mature spermatozoa were motile with normal morphology. However a small but significant proportion of sperm still retained morphological abnormities. We conclude that appropriate levels of PP1γ2 in developing germ cells and a concomitant expression of the PP1γ1 isoform in Sertoli cells are required for normal spermatogenesis, sperm morphology and motility.

THE RECONSTRUCTION OF PALEOCLIMATE OF SOLEDAD BASIN FROM BENTHIC FORAMINIFERAL ASSEMBLAGES INFLUENCED BY CHANGES IS PRODUCTIVITY AND VENTILATION SINCE EARLY HOLOCENE

By Nivedita Mehrotra

Keywords: Benthic Foraminifera, Soledad Basin, Bottom water Oxygen, Marine Productivity.

The scope of the topic is to evaluate the relative importance of physical and biological variation in the bottom water oxygen level at depth up to 542m on the Baja margin of the Soledad Basin from Holocene to almost a past 15k.y. and how the global climate variation due to the movement of the earth and changes in its orbital motion. Sediment from core OXMZ MV99-PC14 (hereafter core PC14) collected off the Magdalena Margin of Baja California, Mexico will be analyzed for the presence benthic foraminifera evaluating marine productivity and change in bottom water oxygen. Soledad Basin, located off the coast of Baja California at latitude 25^0 12.07' N, longitude 112^0 43.0' W is an ideal location to study paleoclimate oscillations due to its depth (540m) and the sediment rate (~110cm/kr). Taxonomic counts will be used for reconstruction of paleoclimate indicators in the Soledad Basin from the Early Holocene (about 13kyr) and to recent.

RNA OXIDATION IN THE BRAIN OF ALZHEIMER'S DISEASE

By Qunxing Ding

Keywords: Oxidative Stress, Alzheimer's Disease, Ribosome, Protein Synthesis, Neurodegeneration

Ribosomal RNA is one of the most abundant molecule groups in the cells which have to deal with the reactive oxidative species especially in neurodegenerative disorders. 5S rRNA is the essential component in ribosome and our previous data indicated the decreased level in Alzheimer's disease (AD) and Mild Cognitive Impairment (MCI) subjects. The molecular level and the oxidation level of 5S rRNA were investigated in this study in multiple brain regions including inferior parietal lobule (IP), superior and middle temporal gyri (SMTG), temporal pole (TP) and cerebellum. In addition, the 5S rRNA molecules that haven't integrated in the ribosome complex (free 5S) were separated from that in ribosome complex, and the cytoplasmic portion was separated from nucleus portion to be studied respectively. Data indicated the brain-region specific alternation of the molecular level and increased oxidation level of 5S rRNA. In situ RNA hybridization indicated that 5S rRNA distributed in both cytoplasm and nucleus, and the free 5S rRNA was oxidized significantly especially in AD subjects, in both cytoplasm and nucleus. In conclusion, the molecular level of 5S rRNA in AD subjects was decreased in multiple brain regions and their oxidation especially the free 5S rRNA had the most significant increase, which may contribute to the alteration of protein synthesis in AD brain.

ABBEYS AND PRISONS: SHAKESPEAREAN SHADOWS IN JANE AUSTEN'S NORTHANGER ABBEY

By Randi Pahlau

Keywords: Shakespeare, Austen

Shakespeare's influence on Jane Austen has been well documented. Scholars have found parallels between several of the plots, characters, and wording of his plays and the plots, characters, and wording in Austen's novels. One comparison that has not yet been conducted is Shakespeare's "A Winter's Tale" and Austen's "Northanger Abbey." My presentation will compare the two, demonstrating parallels between them, particularly Gothic elements common to both.

INTERACTION OF CDC25B PHOSPHATASE WITH 14-3-3 PROTEINS IN OVARIES AND OOCYTES OF ADULT MOUSE

By Santanu De

Keywords: CDC25B, 14-3-3, Ovaries, Oocytes, Oocyte Maturation

Oocytes are known to be arrested at prophase I of meiosis due to a high intracellular concentration of cyclic adenosine monophosphate (cAMP) to keep protein kinase A (PKA) active, which phosphorylates and inactivates mitosis promoting factor (MPF). Release of meiotic arrest (oocyte maturation) occurs during the pre-ovulatory surge of luteinizing hormone (LH) when cAMP levels fall, activity of PKA declines and MPF is dephosphorylated and activated by the M-phase inducer phosphatase 2 (CDC25B). 14-3-3 proteins are key regulators in various important intracellular events including signal transduction, protein trafficking, cell cycle control, apoptosis and embryonic development. There are seven mammalian isoforms of 14-3-3 (beta, gamma, zeta, eta, epsilon, tau/theta and sigma) encoded by separate genes. 14-3-3 proteins are thought to bind to and sequester phosphorylated CDC25B in the cytoplasm of oocytes, holding the cell in prophase I arrest. The details of this interaction are not yet fully known and we are exploring the role of the 14-3-3/CDC25B interaction and the role(s) of 14-3-3 isoforms in regulation of meiosis. We have identified the different isoforms of 14-3-3 in adult mouse ovaries, oocytes and eggs by Western blotting, immunocytochemistry and immunohistochemistry, with characteristic similarities and differences in relative amounts, distribution and patterns of expression. We detected phosphorylated as well as unphosphorylated CDC25B in adult mouse ovaries, and only the phosphorylated form in oocytes, by Western blotting. Phosphorylated CDC25B was found to co-immunoprecipitate with 14-3-3 beta in protein extracts from adult mouse ovaries. CDC25B was also detected by Western blotting of protein complexes purified by Tandem Affinity Purification (TAP) from ovaries of transgenic mice carrying TAP-14-3-3 zeta. Immunofluorescence staining and confocal microscopy showed translocation of CDC25B into the oocyte nucleus (germinal vesicle) along a two-hour time course assay during maturation of mouse oocytes, as had been found by previous studies. These and subsequent results will allow us to elucidate the nature and importance of 14-3-3 protein interactions with CDC25B phosphatase in mammalian oocyte maturation.

IMPROVEMENT IN RESPONSE TIME OF VA LCD BY POLYMER STABILIZATION

By Sarah Hicks

Keywords: Liquid Crystals, Polymer Stabilization, Vertical Alignment Mode, Response Time, Contrast Ratio, Pre-Tilt Angle

Liquid crystal materials are widely used in display technology and favored over their cathode ray tube counterparts because of their low power consumption, thin geometry, and wide range of display sizes and applications. One type of liquid crystal displays (LCDs) popularly used is the vertical alignment (VA) mode display. In VA mode, the director of a liquid crystal material goes from the initial homeotropic state (to the planar state when a voltage is applied. Since the display cell is placed between crossed polarizers, the VA mode at zero voltage gives a good dark state [1-3]. It is well known for its high contrast ratio [1-3].

In display application, fast response time is highly desired. For VA-LCD, the turn-on time τON is determined by the applied voltage besides material parameters. The turn-on time can be reduced by applying high voltages (over driving method). The turn-off time τOFF is only determined by the material parameters and cell thickness, and cannot be improved by over driving method. We used a polymer network to improve the response time of vertical aligned (VA) mode liquid crystal display (LCD). The polymer network was anisotropic and was oriented in the same direction as the liquid crystal in the dark (field-off) state. With the polymer network, the turn-off time of VA LCD significantly improved while the contrast ratio remained high.

References

[1] S.-T. Wu and D.-K. Yang, Fundamentals of Liquid Crystal Devices (John Wiley & Sons, United Kingdom, 2006).

[2] M.F. Schiekel and K. Fahrenschon, Appl. Phys. Lett. 19 391-393 (1971).

[3] E. Lueder, Liquid Crystal Displays (John Wiley & Sons, United Kingdom, 2001).

ARACHIDONIC ACID-INDUCED COX-2 EXPRESSION IN NEUROBLASTOMA CELLS INVOLVES HISTONE H3 PHOSPHORYLATION AND ACETYLATION.

By Sarah Houston

Keywords: Neuroscience, Histone Modification, Neuroblastomas, Neuro Oligodendrocyte Signaling Pathways,

Post-translational histone modifications have been linked to alterations in chromatin transcriptional state. Many studies have documented that both histone acetylation and phosphorylation events are associated with transcriptional activation in response to multiple cellular perturbations. However the signaling pathways that mediate these events are not well defined. Using cultured SH-SY5Y cells, we observed that arachidonic acid (ArAc) at 4 h and 24 h increased acetylation of multiple proteins as determined using western blot. Further characterization revealed that histone H3 acetylation was increased by 280% and 154% at 4 h and 24 h of ArAc exposure, respectively. An 168% increase in phosphorylation of H3 was also detected at 4 h in cells treated with ArAc, while H3 phosphorylation returned to basal levels by 24 h of exposure. These events correlated with an 400% increase in the expression of COX-2 at 4 h that also returned to near basal levels after 24 h. Further, we have demonstrated that histone deacetylase (HDAC) inhibition, with trichostatin A (TSA), in mice resulted in an increase in protein acetylation in brain that was accompanied by an increase in COX-2 transcription as determined using microarray analysis. ArAc serves as a common signaling molecule in multiple cascades including those induced by G-protein coupled receptors and in redox-sensitive pathways. As a result, ArAc may serve to link these pathways with cellular transcriptional and translational responses.

WHICH WAY IS LEFT?: THE "RED CHOIR" IN ACTION AND THE SYMBOLOGY OF THE BELGRADE STUDENT PROTEST, JUNE 1968

By Sarah Zabic

Keywords: History, Student Protest, 1968, Yugoslavia, Communism

The student protest of June 1968 in Belgrade offers excellent insight into the transitional decade 1965-75 in the Socialist Republic of Yugoslavia. It is historically significant because protest was primarily a movement of communist youth who wanted reform within Yugoslavia's self-management system: it was an ideological challenge to the government and the League of Communists of Yugoslavia that demonstrated that communism was indeed not a monolithic construct in Yugoslavia. Police brutality during a demonstration sparked the protest on the evening of June 2, 1968, but it quickly turned into an expression of humanist Marxist ideology and spread to other university campuses across Yugoslavia. The students intended to effect social change by redefining important premises of the state's educational, economic, and political policies within the confines of socialism. Specifically, the students wanted to expand social justice, civil rights, and increase job opportunities for their generation, particularly in academia. Importantly, the government's response to the student protest revealed its unwillingness to rely solely on brute military force to put down a protest in the civil sphere, as the Soviet Union would do in Czechoslovakia two months later. In addition to the rituals and songs the students utilized during their protest,this paper will analyze the student's Political Action Program, two diaries from participants, and a speech from Marshall Tito himself to demonstrate that the student protest of 1968 was a significant example of a large-scale ideologically motivated purposive social action challenging the Tito's vision of socialism on a grand scale.

Note: This paper relies on data that was collected in Serbia and Croatia in summer 2009. This trip was made possible by a travel grant from the Graduate Student Senate.

Young Children's Social Symbolic Play with Language Development
By Shu Hui Lin
Keywords: Home literacy practices, Second Language Acquisition

The purpose of this study is to understand and to describe how Chinese families support their children's Mandarin-English acquisition through use of home literacy practices. Many countries have implemented bilingual education based on multiculturalism because maintenance of children's native-language ability preserves their ethnic culture (Bayley, Schecter, & Torres-Ayala, 1996; Broekhuizen, 2002; Cho, 2000; Guardado, 2002; King & Fogle, 2006; Liu, Benner, Lau, & Kim, 2009; Liu & Bianco, 2007; Luo & Wiseman, 2000; Yang, 2007) and also benefits second-language learning (Cummins 1991, 1992; Liang & Mohan, 2003; Zhang & Slaughter-Defoe, 2009). Learning languages entails more than simply learning grammar, vocabulary, and pronunciation; it also involves learning the depth of cultures and ethnicities that generations pass on; therefore, many Chinese parents expect and support their bilingual children as they become biliterate (Mandarin/English speaking, listening, reading and writing).

The study has three purposes: (1) To determine the Chinese parents' roles, expectations, and values in supporting their children's biliteracy acquisition. (2) To understand the home literacy practices adopted by Chinese parents promote their children's achievement of biliteracy. (3) To provide suggestions and practices for other immigrant families who face similar challenges, and help school and teacher to cooperate with parents to assist bilingual children at home and in school. To facilitate the line of inquiry, the study derives from two research questions: (1) What are the parents' roles, expectations, and values in supporting their children's biliteracy acquisition? (2) What home literacy practices that parents adopt to promote their bilingual children in achieving biliteracy? Three bodies of knowledge were included in this case study. The first reviews the Chinese immigrant families in the United States which include the nature of the Chinese families, immigrant families, and parents' bilingual experiences. The second involves the literature of home literacy practices in the sociocultural and sociolinguistic context. The third illuminates the level of the knowledge base in child literacy development which promote literacy acquisition in first language (Mandarin) and in second language (English), and how literacy practices occurring within the family in the home setting.

Research as systematic investigation aims to discover and develop new ideas that contribute to the advancement of knowledge and wisdom with outcomes accessible for others to discuss and use (Bassey, 1999; Swann & Pratt, 2003). Qualitative case study research was used to investigate five purposefully selected Chinese students' families' home literacy practices in one Ohio academic community, USA. For better understanding of how parents socially interact with children as well as the literacy environment provided at home, my data collection strategies took place over a 4-month period and comprised home visits and observations, in-depth interviews, field notes and journal entries, and collected relative literacy documents. The findings will provide suggestions and strategies for other families who face the challenge of biliteracy acquisition and will help school personnel to cooperate with parents in assisting bilingual children at home and at school. This study calls for generous support for teachers, parents, and children who are working hard to face the challenges of biliteracy, heritage-language preservation, and bilingualism.

HIV-1 EVOLUTION AND EPITOPE ASSOCIATIONS

By Sinu Paul

Keywords: HIV-1, Evolution, Epitopes

Human Immunodeficiency Virus (HIV-1) is one of the fastest evolving organisms on the earth and responsible for millions of deaths and infections every year. Despite intensive research for many years, a vaccine that can give total protection or a drug that can give complete cure remain to be designed. Epitope vaccines have been suggested as a strategy to counteract viral escape and development of drug resistance in various infections. Epitopes are the discrete regions on the antigens that are being recognized by the host immune system and multiple studies have shown that Cytotoxic T-Lymphocyte (CTL) and T-Helper (Th) epitopes can generate strong immune responses in HIV-1. However, not much is known about the relationship among different types of HIV-1 epitopes, particularly those epitopes that can be considered potential candidates for inclusion in multi-epitope vaccines.

In this study we used association rule mining to examine relationship between different types of epitopes from nine protein-coding HIV-1 genes to identify strong associations as potent multi-epitope vaccine candidates. Our results revealed many "epitope-associations" that were consistently present in majority of the HIV-1 genomes found worldwide. 137 of these associations included epitopes of two different types (CTL and Th) from three different genes (Gag, Pol and Nef) and involved 14 non-overlapping genomic regions. These epitope regions were also highly conserved at both amino acid and nucleotide levels indicating strong purifying selection driven by functional and/or structural constraints and hence, diminished likelihood of successful escape mutations. Thus, our study provides a comprehensive survey of CTL, Th and Ab epitopes that are both highly conserved and co-occur among all subtypes of HIV-1, including circulating recombinant forms. Several co-occurring epitope combinations were identified as potent candidates for inclusion in multi-epitope vaccines, including epitopes that are immuno-responsive to different arms of the host immune system and can generate stronger and more efficient immune responses, similar to responses achieved with adjuvant therapies.

INFRARED SPECTROSCOPIC IMAGING OF MULTIPLE SCLEROSIS TISSUE

By Stephan Woods
Keywords: Imaging, Spectroscopy, Multiple Sclerosis

In the present study we describe a technique that utilizes infrared vibrational spectroscopy to study the chemical and morphological changes in multiple sclerosis lesioned tissue. A focal plane array detector (FPA) was used to obtain chemicospatial information from human brain tissue samples. By monitoring the ratio of carbonyl stretching ν(C=O)1740cm-1 to δCH2 scissoring 1468cm-1 the oxidation of lipids was studied which has long been used as an indicator of MS(wetzel). It was found that the lipids in the lesion area were not oxidized homogenously. In an attempt to increase the information that could be obtained from the FTIR imaging of MS lesions we have also employed multivariate statistical methods, namely Hierarchial cluster analysis (HCA). HCA Analysis of the C=O stretching band (1740 cm-1) and the CH2 scissoring mode (1468 cm-1) in conjunction with bands associated with proteins (1600 – 1700 cm-1) and DNA (1020 – 1200 cm-1) were used. It was found that the inclusion of the protein, lipid and DNA associated bands leads to a significantly different image morphology with respect to each other as well as to the chemical mapping. HCA mapping of the DNA region pointed to the oxidation of the DNA and that this oxidation was not homogenous throughout the lesion. This DNA oxidation identification may be the first step in the identification of a pre-lesion.

DETECTION OF IMMUNE COMPLEXES USING CHIRAL NEMATIC CHITIN FIBRILS

By Steve Fiester
Keywords: Biosensing, Salmonella, Liquid Crystal, Chitin

Bacterial pathogen testing typically involves culture-based techniques that can take several days to report results. Liquid crystal-based biosensors have the capability of rapidly identifying bacteria, when an optical distortion of the liquid crystal occurs. Distortions occur due to antibody binding events between antibodies and antigens resulting in the formation of immune complexes. When introduced into a liquid crystal, immune complexes cause defects in the liquid crystalline texture detectable with crossed polarized microscopy. We hypothesize that chitin, a ubiquitous biopolymer, can be formulated as a sensitive liquid crystal that reports the presence of streptavidin-coated bead (as bacterial surrogates) and Salmonella immune complexes. Streptavidin-coated bead and Salmonella immune complexes were detectable as defects in liquid crystalline chitin to an initial concentration of 106. Defects caused by streptavidin-coated bead immune complexes were larger in comparison to those formed by Salmonella immune complexes at the same starting concentration. We conclude that the liquid crystalline phase of chitin can be utilized for biosensing immune complexes.

UTILIZATION OF ORGANIC VS INORGANIC FORMS OF NITROGEN BY BACTERIA ISOLATED FROM STREAMS WITH VARYING NITRATE CONCENTRATION

By Suchismita Ghosh

Keywords: Heterotrophic Bacteria, Organic And Inorganic Nitrogen, Streams, Nitrogen Utilization

Nitrogen (N) is an important element of our biosphere because it serves as the building block for essential biological molecules like amino acids and nucleic acids. Though nitrogen gas is abundant and comprises approximately 78% of the Earth's atmosphere, but it is unavailable to living organisms. The availability of nitrogen in all ecosystems is dependent on inputs of biologically available nitrogen from external sources or internal cycling of nitrogenous compound into biologically available forms. Bacteria are ubiquitous; they can utilize and transform a wide range of nitrogen compounds into biologically available forms. Better understanding of the nitrogen cycle in streams is important because with increased agricultural practices there has been excessive input of fertilizers and thus enhanced rates of nitrogen loading into these lotic systems. Algal blooms and formation of dead zones in lakes and oceans are consequences of downstream transport of these nutrients. A very important aspect of the N cycle is uptake of various forms of nitrogen by the microbial community. Of the total nitrogen pool in freshwater ecosystems a substantial proportion is comprised of organic nitrogen yet traditional research has focused on the uptake of dissolved inorganic forms of nitrogen primarily ammonium (NH4) and nitrate (NO3) by heterotrophic bacteria. Organic forms of N can serve as an important source of N for the stream bacterial community. In this study we focus on the patterns of utilization of organic and inorganic forms of nitrogen by heterotrophic bacteria isolated from streams with varying nitrate concentration. Water and sediment samples were collected from one forested stream in Ohio and will be collected from two more streams, an agriculturally impacted and a forested stream, located in Indiana. Sediment samples collected so far were enriched in minimal media with seven different nitrogen amendments and in a complex media (nutrient broth) for different lengths of time to isolate the fast and slow growers. Bacteria isolated from these enrichments were grown in various sole source nitrogen compounds and their growth rates determined by measuring the bacterial cell density at different time intervals using spectrophotometry.

High cell density (> 3.4 Optical Density [OD]) was observed in growth medium with nitrate, glycine, a defined mixture of nitrogen compounds and nutrient broth whereas low cell density (< 0.126 OD) was observed in enrichments with bacterial protein as the nitrogen source. More than 90% bacteria isolated were gram negative coccobacilli. Preliminary growth curve data indicate bacteria isolated from nitrate enrichment showed similar growth in various sole source nitrogen treatments (average rate 2.02 generations [gen]/hr). All isolates showed low growth in tryptophan treatment with the exception of the positive control. Bacteria isolated from protein enrichment was a slow grower and did not grow well (maximum OD < 0.05) in other nitrogen treatments even after 48 hours of incubation. Our results so far suggest a variation in nitrogen utilization by bacteria isolated from different nitrogen enrichments. Bacteria isolated from recalcitrant sole source nitrogen compounds were more specialized in uptake of complex forms over the ones isolated from inorganic forms.