URCAD 2010
Featured Presentation Abstracts

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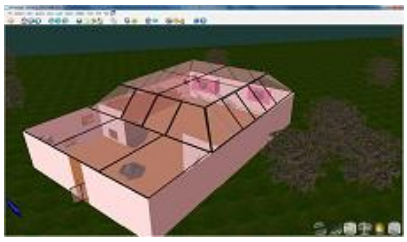
Virtual Museum: Life as a Dance



Franki L. Trout, **Danielle Viens-Payne, Kelly-Lynne Russell**
Preminda S. Jacob, Associate Professor, Department of Visual Arts
May Chang, Head of IT Services, Albin O. Kuhn Library

The goal of this project was to apply the skills and techniques of a museum curator to create and install an art exhibition in a virtual space. Our exhibition explores the idea that dance is something in which everyone participates every moment of every day and not just formal performance.The museum space is designed to resemble a dance studio with hardwood flooring, ballet barres, and floor length mirrors. Upon entering the vast room, visitors are placed in a space stereotypically reserved for only those individuals trained as "dancers." The lines between who is a dancer and who is not continue to blur as visitors must strain, bend, and stretch their bodies in different positions in order to view the various works of art placed throughout the exhibition. By placing this museum online, people from all over the world may visit our virtual exhibition and experience the concepts we present. Such virtual art museums make art and the artistic experience more globally accessible.
(Top)

No Development Without Girls: Gender, Development and Youth Associations in Mali

Sarah B. Solomon
Gloria Chuku, Associate Professor, Department of Africana Studies

Feminist and development scholars have not adequately addressed the implications of youth activism in West Africa. Changing gender dynamics among Malian youth are generated and navigated in the context of youth associations. Girls in Mali are beginning to join and act as leaders in Malian youth associations. This phenomenon has countless implications for gender dynamics in Mali, and it is contributing to increased numbers of women in the public sphere. The study is an attempt to represent the experiences of girls who participate in Malian youth associations, and to extrapolate the significance of these experiences. Thirty-one interviews were conducted with members of ten youth associations. Interviewees were mostly young Malian women who were currently participating in youth associations or had participated in the past. Youth associations in Mali are shaping future leaders, mobilizing youth to be active in public life and raising awareness about vital issues facing the country. Focusing attention on Malian youth associations reveals how gender and youth activism are both relevant within development discourse.
(Top)

Spatial Dynamics of the Eastern Mud Turtle *Kinosternon subrubrum* in a Freshwater Tidal Marsh

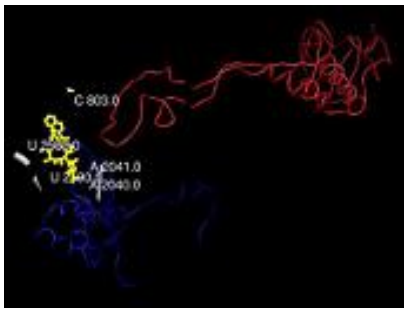
Rebecca A. Reeves
Christopher Swarth, Sanctuary Director, Jug Bay Wetlands Sanctuary
Christopher M. Swan, Associate Professor, Department of Environmental Science

The Eastern Mud Turtle (*Kinosternon subrubrum*) is a small, semi-aquatic turtle native to the Eastern United States. Relatively little is known about the movement patterns or home ranges of these turtles. Previous studies have focused on seasonal movements or have studied home ranges in space-limited environments, such as small farm ponds. This study examined Mud Turtle home ranges in a large, freshwater tidal marsh using radio telemetry data from two consecutive activity seasons to determine whether or not home range size is a function of habitat availability. Our findings, using the minimum convex polygon analysis, indicated that the average home range size for mud turtles in this environment was well over the previously published estimate of 0.05 hectares. Males have a larger average home range size than females, however there were no statistically significant differences in male and female home

range size. Males also tended to disperse farther from their winter hibernacula, in riparian meadows and forests, than females did to reach their activity season home ranges. More study is necessary to clarify these trends and to reduce variation in the data since this information will be of value in future conservation and land-use decisions.
(Top)

Isolation and Characterization of Mutations in Ribosomal Proteins L4 and L22 that Confer Ketolide Resistance

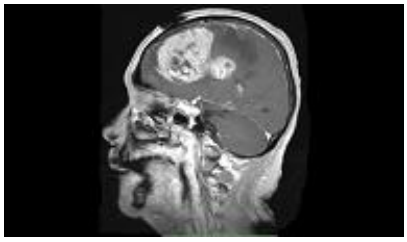
Asmara Qamar
Janice M. Zengel, Senior Research Scientist, Department of Biological Sciences



Extended domains of ribosomal proteins L4 and L22 penetrate into the core of the large ribosomal subunit and contribute to the narrowest region of the peptide exit tunnel. Several types of antibiotics, including macrolides and ketolides, interact with the tunnel, and mutations in L4 and L22 have been shown to confer resistance to these antibiotics. The novel ketolide antibiotic Cethromycin is currently undergoing development for the treatment of community-acquired pneumonia and biodefense pathogens, and is considered more potent than macrolides, possibly because it makes more contact points: in addition to 23S rRNA domain V, it also makes contacts with domains II and IV. This study aims to isolate and characterize E. coli strains with mutations in L4 and L22 by selecting for growth on Cethromycin. Currently, eight mutants have been isolated, six of which are novel; three of the latter display out-of-frame deletions that are predicted to eliminate a majority of the L22 protein. Additional mutants are also being generated through QuikChange mutagenesis. The growth rate and degree of antibiotic resistance of these mutants will be assayed, as well as the mutant ribosome's binding affinity to Cethromycin. By characterizing antibiotic resistant mutants, this project hopes to shed additional light on mechanisms of ribosomal protein-mediated antibiotic resistance.
(Top)

Small Molecule Inhibitor of Anti-Apoptotic Proteins, ABT-737, in Glioblastoma Multiforme Stem Cells

Priyanka Bushana
Gary Gallia, Assistant Professor, Department of Neurosurgery, Johns Hopkins University
Avadhut Joshi, Post-Doctoral Fellow, Department of Neurosurgery, Johns Hopkins University



Glioblastoma Multiforme (GBM) is the most common and aggressive form of intracranial malignancies. Median patient survival remains at less than 15 months despite aggressive surgical, chemotherapeutic, and radiotherapeutic treatments. In this study, we hypothesized that part of GBMs' resistance to chemotherapeutics can be attributed to their high expression of anti-apoptotic proteins of the Bcl-2 family; therefore, targeting Bcl-2 would increase sensitivity of GBM cells to chemotherapy. To follow up on this hypothesis, we assessed the levels of Bcl-2 family proteins in GBM cell lines. We were able to conclude that Bcl-2 family proteins were significantly increased in GBMs grown as oncospheres as opposed to adherent serum-grown cell lines. Following these trials, we measured the efficacy of ABT-737, a small molecule inhibitor of these proteins. In addition, we tested the effects of ABT-737 in combination with receptor tyrosine kinase (RTK) inhibitors. The results were in accordance with our observations, as the ABT-737 treatment inhibited the GBM stem cells, but had little effect on the adherent cell lines. Furthermore, combination therapy demonstrated that sunitinib and ABT-737 synergistically inhibited GBM stem cells. These observations suggest that Bcl-2 can be targeted in GBM stem cells and warrants further investigation of ABT-737 in preclinical animal models.
(Top)

Deconstructing the Nerd: Visual Acuity and Need for Cognition in Adults

Tahira C. Mahdi
Shawn M. Bediako, Assistant Professor, Department of Psychology

The classic definition of a "nerd" is very consistent with what psychologists suggest are characteristics of a person who is high in need for cognition – an enjoyment of and participation in effortful cognitive activities. For example, people who wear glasses or conspicuous corrective lenses fit the stereotype of such individuals who have been portrayed in popular media as conscientious and prone to engage in esoteric pursuits. However, there is very little research examining the relation between personality traits (e.g., "nerdiness") and physical characteristics (e.g., quality of vision). In the current study, a sample of 80 adults varying in age, educational background, and quality of vision, completed a brief demographic survey, the Need for Cognition Scale, a measure of visual acuity, and two perceptual tasks. We examined the relationship between visual acuity and need for cognition and explored whether this relationship was mediated by age or level of education. We expected that individuals who were nearsighted would possess a higher need for cognition compared to those who were not. The results of this study hold several implications for educational settings and may also yield evidence that personality traits are uniquely related to physical characteristics.

(Top)

Male Breast Cancer: Three Portraits

Michelle Renay Wilson
Calla Thompson, Assistant Professor, Department of Visual Arts

My research combines documentary photographs of three male breast cancer survivors with theiritten narratives as a way to record the physical and psychological effects of male breast cancer. In 2009, according to the National Cancer Institute, men accounted for one percent, or 1,990, of all breast cancer cases in the United States. That same year the institute also reported 440 male breast cancer deaths. Because of the relative rarity of breast cancer in men, some men delay discussing changes in their bodies with a physician. My research with three survivors, Robert Kaitz, Brandon Greening, and Dale Allen Crowley, extends the current dialogue that represents breast cancer as a female disease. I produced post-surgery portraits of shirtless male breast cancer survivors as well as photographs of the subjects involved in their daily lives. In addition to acting as a record of three men's struggles and triumphs, the images combined with written testimonies convey the importance of awareness and early detection as critical to long term survival.

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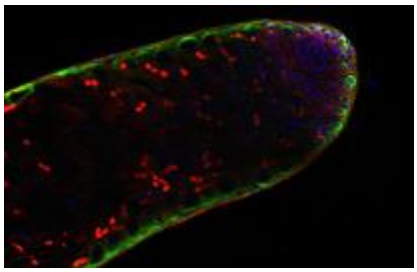
Apontic, a Novel Regulator of the JAK/STAT Pathway in *Drosophila* Testis



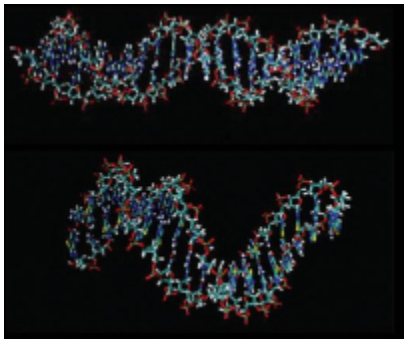
Archana Murali
Michelle Starz-Gaiano, Assistant Professor, Department of Biological Sciences

Adult stem cells maintain their undifferentiated state through signaling networks present in their niche, and understanding these complex regulatory mechanisms will provide a major advancement in the field of stem cell research. The *Drosophila* testis supports two stem cell populations, the germline stem cells (GSCs) and the cyst progenitor cells (CPCs). The GSCs undergo asymmetric divisions to produce the sperm. The GSCs and CPCs surround a cluster of somatic cells called the hub, which acts as the niche. The hub secrets a ligand, Unpaired, that activates the JAK/STAT pathway, which is responsible for maintaining both stem cell populations until they move away from the niche and begin differentiation. In previous research, we identified a novel regulator of the STAT pathway, Apontic *(*APT*)*, in *Drosophila* ovaries and demonstrated that STAT turns on *apt*, which feeds back to

inhibit STAT activity. In this study, we are testing whether this mechanism also occurs in testis. Consistent with our predictions, we have found that *apt* is expressed in the hub in high levels. Determination of whether *apt* is required for stem cell maintenance and if so, whether it acts independently or through one/more co-regulators such as SOCS, another negative regulator of STAT present in testis, is underway.
(Top)

Extended Pyrimidine Nucleoside Analogues: Investigations into DNA Structure and Function

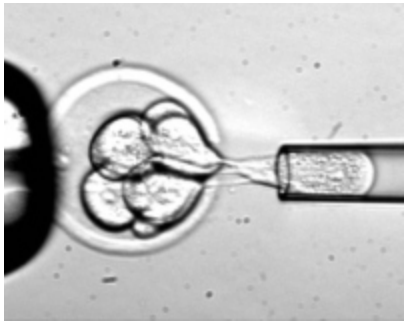
Nathaniel T. Kim, **Kartik Temburnikar**
Ketherine Seley-Radke, Associate Professor, Department of Chemistry and BioChemistry



Watson and Crick's model of DNA is based on shape and hydrogen bonding complementarity and thereby limits deviation from the natural genetic alphabet, however the possibility of additional "letters" could prove beneficial for a variety of reasons. In conjunction with our studies of heteroexpanded purine analogues, we have introduced a heteroaromatic ring extension to the pyrimidine base, thereby increasing the aromatic surface area and polarizability, and subsequently, increasing stacking effects. The normal hydrogen bonding motifs necessary for recognition and minor groove interactions are retained. Moreover, the heterocyclic extensions possess additional hydrogen bonding elements for exploring other helix interactions, which can provide further advantages for studying DNA structure and function. The DNA analogues were evaluated by incorporating them into oligonucleotides and monitoring their melting temperatures and florescence. More specifically, the extended pyrimidines offer enhanced characteristics for recognition by enzymes, making them interesting candidates to probe DNA and viral polymerases. In that regard, the synthesis and preliminary biological studies of these novel analogues will be presented herein.
(Top)

The Business of Marketing Preimplantation Genetic Screening

Richard S.L. Blissett
Andrea Kalfoglou, Assistant Professor, Department of Sociology and Anthropology



Preimplantation Genetic Screening (PGS) is a reproductive technology that is often marketed to infertile couples to improve chances of pregnancy by transferring only viable embryos to the womb, but there is evidence showing that it may not be effective. In some clinics, PGS is offered to older women, those with repeated IVF failure, and those with recurrent pregnancy loss, but many clinics believe that PGS should be used to screen all IVF embryos. In 2007, the Practice Committee of the American Society for Reproductive Medicine (ASRM) published a review of PGS studies and concluded that available evidence from studies of pregnancy outcomes does not support the use of PGS for any of the conditions discussed above. Other studies found that it may hurt chances of pregnancy. This could be due to any number of factors. Based on a comprehensive literature review and comparison to the basic principles of bioethics, I will argue that, until PGS is proven effective, it should only be offered in clinical trials where patients are not expected to pay for the experimental screening. Until then, there should be greater efforts to inform both patients and clinicians about the experimental nature and lack of efficacy of PGS.
(Top)

“Harlem at its Best”: Popular Culture, Nightlife Venues and Emergence of a Queer Subculture during the Harlem Renaissance

Megan M. Hardy
Michelle R. Scott, Associate Professor, Department of History

Few people know that in addition to becoming one of the most populous black communities in the United States, 1920’s Harlem also fostered the growth of a queer subculture during the period known as the Harlem Renaissance. This growth was fueled by a combination of factors: twentieth century freedom of sexual expression, popular entertainment, community monetary interests and white pleasure seekers, all of which spawned the emergence of sexualized nightlife venues with a laissez-faire attitude. In Harlem, the upsurge of rent parties, cabarets and Blues music provided a space for the emerging queer community to openly discourse and publically socialize that may not have existed without the heightened sexualized environment. The formation of this distinctive queer community is most evident in the transition of queer socialization patterns; from mingling alongside heterosexuals at mainstream nightlife entertainment venues, to the usurpation and transformation of dominate culture practices into their own organized functions. While conducting this research, I examined numerous primary sources including: invitations, short stories, period novels, personal essays, four period newspapers and magazines, blues lyrics, and popular art. I also supplemented primary source findings with research from ten historical monographs and five academic journal articles.

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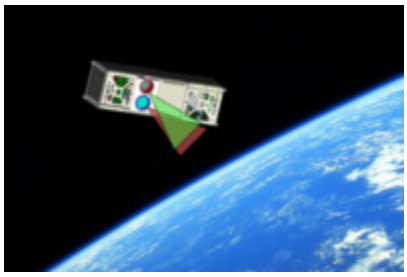
Cloud-CubeSat: Designing a Picosatellite



James Gerity, Tyler Schmitz
J. Vanderlei Martins, Associate Professor, Department of Physics

At this time, 3D measurements of cloud structure and thermodynamic properties (vertical distribution of droplet sizes, thermodynamic phase, etc.) are difficult to obtain. Generally, these data are collected during *in situ* aircraft experiments, which typically last several hours. The picture they provide is therefore inaccurate; the structure of the cloud has changed by the time the measurements are completed. However, these data can be indirectly obtained by measuring optical properties of the cloud; taking a 'picture' of the cloud from a satellite in space allows for a complete view of the cloud at an instant, from which the desired properties can be retrieved and studied using conventional methods. The cost of designing, launching and operating a full-scale satellite is extremely high. With this work we show that these measurements can be performed from a much smaller satellite with the proper sensors. We have created the specifications for a 10x10x30cm 'CubeSat', conforming to guidelines for picosatellites set forth by California Polytechnic with the intent of minimizing the cost of a satellite mission. The UMBC Laboratory for Aerosols, Clouds, and Optics (LACO) has purchased many of the necessary components for this satellite, and performed several tests confirming the feasibility of such a mission.

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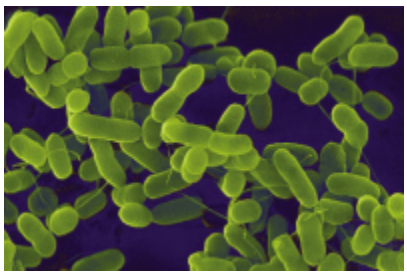
The Development of a Biological Antioxidant Capacity Assay Using Green Fluorescent*E. coli*



Phillip H. Kang, **Leah Tolosa**
Leah Tolosa, Research Associate Professor, Department of Chemical and Biochemical Engineering

Oxidative stress in biological systems can lead to numerous disorders, including Alzheimer’s disease, cancer, and heart disease. Antioxidants in food, such as Vitamin C, minimize and prevent the effects of oxidizers.

Therefore, it is important to determine antioxidant amounts in supplements and food through antioxidant capacity assays. Current methodologies utilize chemical assays that may not reflect bodily responses. Many organisms battle oxidants through inducible responses, such as the SoxRS regulon in *E. coli*. In this study, cell-based assays were designed by fusing genes within the SoxRS regulon (*sodA*, *soxS*) with the green fluorescent protein (GFP) gene in order to quantify antioxidant capacity through fluorescence inhibition at different oxidant and antioxidant concentrations. It was hypothesized that as antioxidant concentration increased, fluorescence would decrease but different genes would not respond identically. The results showed that, at higher antioxidant concentrations and a fixed oxidant concentration, fluorescence inhibition increased for both *sodA::gfp* and *soxS::gfp*. Also, the *sodA::gfp* system supported previous research that it is the most responsive in the SoxRS regulon, and suggests that different genes respond differently to specific antioxidants. Through future research, it may be possible to categorize antioxidants and allow diseases to be treated in a more specific and effective manner.
(Top)

Examining Parental Acculturation, Socialization Goals, and the Development of Korean Immigrant Children

Annah Seo
Charissa S. L. Cheah, Associate Professor, Department of Psychology

In 2000, there were 1,077,000 Koreans in the U.S.; they were the fifth largest Asian-American ethnic group. However, there is limited research on Korean-American parents and children. This project examined the associations among Korean immigrant mothers' acculturation, parenting socialization goals, and their children's social, emotional, and behavioral outcomes. Ninety-seven Korean immigrant mothers with three- to six-year-old children participated. Mothers were interviewed regarding their long-term socialization goals for their children and completed questionnaires regarding their behavioral and psychological acculturation levels. The children's teachers also rated their social, emotional, and behavioral development in the classroom. Results revealed that Korean-immigrant mothers valued self-maximization, self-control, decency, lovingness, and proper demeanor goals, in that order. More behaviorally Americanized mothers reported less physical well-being and more personal-integrity child- socialization goals. Mothers who reported socialization goals focusing on personal and economic potential were less likely to have children with conduct and peer relationship problems, whereas children with mothers who reported socialization goals focusing on religious values were less likely to be pro-social. Korean families' immigration experiences, and these findings' potential to inform future research and policies to promote the successful adaptation of Korean immigrant children and their parents, will be discussed.
(Top)

Medieval and Renaissance Shawms: An Exploration of Embouchure

Meghan Sommers
Joseph Morin, Lecturer, Department of Music

Modern oboes trace their lineage back to shawms, double-reed instruments seen in Europe as far back as the twelfth century. Whereas present-day oboes are played with the double reed between the lips so that the lips can control reed placement, aperture, and a variety of other variables, for shawms the mechanism and degree of lip-control, called*embouchure*, is not clear. Despite prolific use during the thirteenth through seventeenth centuries, a lack of surviving instruments complete with reeds and pirouettes hampers our understanding of the European medieval and Renaissance shawm. As such, significant disagreement exists among scholars and performers as to the amount of lip control historically employed to play pirouette-bearing instruments. This study includes evaluation and critique of modern texts about shawm-playing in light of consultation with original historical documents, art work, and measurements of surviving original instruments. Consideration is also given to shawms from other parts of the world to see how their performance

technique might provide clearer understanding of European shawms. Understanding the historical performance practices of music is essential to the very music itself, as well as the nuanced role that music and musicians played in their respective contemporary societies.
(Top)

New Perspectives on Old Views

Katherine Bentz, Catherine Pasqualoni, Christina Ross, Sarah Carney
Richard S. Mason, Lecturer, Department of Ancient Studies

Most research in the field of Ancient Studies focuses on the monument or artifact in question in specific context to the ancient world. While this is, of course, extremely important, there is so much more to be learned from the object. Our research explores five temples of ancient Athens, analyzing nineteenth century photographs of them, all of which are the property of UMBC Special Collections, and comparing them to modern photographs taken by Ancient Studies students and faculty during their travels. Central to our study were legal and ethical issues involved in the fields of curation and conservation, as well as a deep investigation into the reasons for which nineteenth century photographers, modern day tourists, and archaeologists and museum curators throughout history ever bothered to look at such monuments. By studying these monuments, we learn much about the people who built them, and the people who either destroyed or preserved them. Through a deeper understanding of them, we come to gain a deeper understanding of ourselves.
(Top)

Adolescent Father's Parenting: Effects of the Mother-Father and Mother-Grandmother Relationships

Areej H. Kuraishi, Kelly Sheperd, Charissa S. L. Cheah
Charissa S. L. Cheah, Associate Professor, Department of Psychology

There is limited research on the effects of relationships in three-generational households on adolescent father involvement and parenting. The purpose of the present research was to examine the relations between the (a) mother-grandmother (of the baby) relationship, (b) mother-father relationship, and (c) adolescent mother's perceptions of the baby's father's parenting. Participants included 69 adolescent mothers (14-20 years old) with 1-8 month old infants who completed measures of demographic information, relationship quality with the grandmother and baby's father, and positive parenting practices. Participants were predominantly African American and in continued relationships with the baby's father. Results revealed that a higher quality relationship with the father was positively related to the young mother's perceptions of his involvement and parenting. Importantly, the mother-grandmother relationship was only associated with more positive perceptions of the father's parenting when the mother and father also had a positive relationship. These findings suggest that promoting a secure relationship between adolescent parents may in turn promote positive parenting behaviors. Further, the grandmother may serve as a source of support for this relationship and in turn foster positive parenting. Examination of these variables may ultimately guide community efforts to encourage father involvement by promoting positive relationships within three-generational households.
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