

ABSTRACT

“Influences of Forest Stand Types and Modified Water Sources on Diversity and Abundance of Dipteran Families in a Managed Pine Forest on the North Carolina Coastal Plain”

Presenter: Allgood, David

Co-Author(s): Melissa Vindigni, Adam Morris, Jessica McDonough, Darren Miller

Mentor: Matina Kalcounis-Rüppell

Department: Biology

Intensive pine management involves a mosaic of different forest stand types and modification of natural wetlands into ponds and ditches. We investigated effects of intensive pine management on Dipteran (fly) community structure. We captured insects at different stand types and modified water sources within the managed pine forest, and in a natural forested wetland. We compared abundance, diversity, and evenness of Dipteran Families (1) between forest stand types, and (2) between the natural forested wetland and modified water sources using one-way ANOVAs. There were no differences in the abundance of Families between forest stand types. Families Tipulidae (crane flies), Dolichopodidae (long-legged flies), Ephydriidae (shore flies), Psychodidae (moth flies), and Muscidae (including house flies) were more abundant in the natural forested wetland, while Family Chironomidae (midges) was more abundant at man-made ponds. Dipteran diversity and evenness were highest in stands with young open canopy and at forest edges, and in the natural forested wetland. Our findings indicate that differences in forest stand type and modification of water sources both affect Dipteran diversity and evenness. Modified water sources affected the abundance of only six out of 46 Families. The implications of these differences on community dynamics and ecosystem function remain to be examined.

“Eastern Music Festival”

Presenter: Allman, Derek

Co-Author(s): Crystal Elmore, Jacob Fields, Hannah Welborn, Dustin Miller

Mentor: Lew Brown

Department: Business Administration

In my Advanced Marketing class we are doing a project in which we will develop a Marketing plan for the Eastern Music Festival. The EMF encompasses instructional workshops from well-known, professional musicians for younger musicians striving for success in their musical careers. The EMF attracts patrons through their classes/workshops and concerts. The concerts feature well-known classical musicians and features the students, who perform for the community. EMF does not have a "formal" marketing plan, and it is our job in the classroom to develop one for them.

“Synthesis of Novel Tridentate Nitrogen Ligands with Ferrocene Substituents”

Presenter: Arvanitis, Nicholas

Mentor: Terence Nile

Department: Chemistry & Biochemistry

The synthesis of several novel tridentate ligands with ferrocene substituents will be described. The new ligands were purified using a variety of techniques, such as recrystallization. Their structural identity was confirmed using proton nuclear magnetic resonance spectroscopy, NMR.

“Participation In Inclusive Recreation: Perspectives of Parents with Children with Disabilities”

Presenter: Badgett, Amanda

Co-Author: Stuart Schelein

Mentor(s): Stuart Schelein, Kim Miller

Department: Recreation and Parks Management

Since the passing of the Americans with Disabilities Act in 1990, recreation agencies have been mandated to make all of their programs and services available to participants with disabilities. Traditionally, these agencies provided programs designed for the participation of individuals with disabilities only, segregated from those programs provided for the general public. Research has shown that recreation agencies have struggled to make this transition from segregated programming to inclusive programming. Research has also indicated that parents and their children with disabilities desire inclusive programming. Parents of individuals with disabilities feel that a recreation setting would be the environment most likely to foster social connections. Yet even for agencies who have been identified as exemplary in their provision of inclusive service delivery, only 14% of all of the participants with disabilities who are accessing programs offered by these agencies are choosing inclusive programs versus the traditional, segregated programs. Research is necessary to identify why a gap exists between what parents and their children with disabilities desire (i.e., inclusive programming) and their minimal access to inclusive programs when they are provided. The goal of this project is to gain parental perspectives on this issue, identify the processes that parents of children with disabilities use to decide whether to register them in segregated or inclusive programs, determine what factors influence their decisions, and explore parents' perceptions of benefits accrued by their children from participation in inclusive and/or segregated recreation programs.

“Inhibition of Human Cytochrome P4502B6 by Essential Oils”

Presenter: Bahawdory, Maria

Mentor: Greg Raner

Department: Chemistry & Biochemistry

Essential oils have steadily gained popularity over the last decade as alternatives to more traditional pharmaceutical based therapeutic strategies for treating a variety of health conditions. The aromatic nature of many of these oils comes from constituent aldehydes that make up a significant percentage (by mass) of the oil, and prior studies have shown that aldehydes, in general have a significant potential to inhibit drug metabolizing enzymes in the liver. All of these observations have prompted the current study in which a total of 64 different essential oils have been tested for their ability to inhibit activity of the human CYP2B6, a member of the family of human drug metabolizing enzymes, collectively referred to as Cytochrome P450. These enzymes metabolize environmental toxins and certain common pharmaceutical agents, and inhibition of these activities could therefore compromise an individual's ability to eliminate foreign toxins, or alter the rate at which prescribed drugs are cleared from the body. At a total content of between 0.001 microgram/mL to 50 microgram/mL, the oils showed varying abilities to inhibit the P4502B6 activity, ranging from no inhibition to ~80% inhibition. The mechanism and potency of the inhibitory effects will be discussed in the context of the Michaelis-Menton model for enzyme action. In addition, several of the more potent oils have been evaluated for their content, and the major aldehyde constituents appear to play a major role in the observed inhibition/inactivation.

“Aldehyde Oxidase as a Catalyst for Oxidation in Organic Solvents”

Presenter: Barr, Bobby

Mentor: Bruce Banks

Department: Chemistry & Biochemistry

ALDEHYDE OXIDASE AS A CATALYST FOR OXIDATIONS IN ORGANIC SOLVENTS Aldehyde oxidase is a molybdenum-containing enzyme with the ability to oxidize a wide variety of aldehydes and nitrogen heterocycles. This enzyme is a robust catalyst for possible use in chemical synthesis because it has a broad substrate specificity, does not require expensive cofactors for its oxidative chemistry, operates over an unusually broad range of reaction temperatures and pH, and retains catalytic function in organic solvents. In this project we have studied the ability of rabbit liver aldehyde oxidase to catalyze synthetic scale oxidations of nitrogen heterocycles, including phenazine methosulfate and methyl acridinium iodide, in nonaqueous solvents such as dichloromethane. In addition, we have discovered that aromatic aldimines constitute a new class of substrates for oxidation by the enzyme. In future experiments, we will determine the ability of aldehyde oxidase to catalyze the oxidation of aromatic aldimines to amides using nonaqueous solvent media.

“Searching For Hepatitis C-Associated Osteosclerosis in Ancient Populations Intravenous Drug Use, Blood Rituals and Tattooing”

Presenter: Bennett-Bradshaw, Jodi

Mentor(s): Joan Paluzzi, Mary K. Sandford

Department: Anthropology

Hepatitis C-associated osteosclerosis (HCAO) is a recently diagnosed, rare disorder with a constellation of symptoms which culminate in a rapid increase in bone density. It has been described around the world, with published reports of 11 cases, male and female. Ten of these individuals have formerly participated in intravenous drug use (IVDU) and the eleventh received an unscreened blood transfusion. Hepatitis C is a blood borne disease and both of the above practices are efficient modes of transmission. The long-term purpose of this research will be two-fold: first is to attempt to answer questions about the relationship between blood rituals and the hepatitis C virus (HCV) or a similar virus that behaves like HCV. Second, is to propose the use of artifacts that convey evidence of blood rituals (e.g. in ancient art or pottery) as a catalyst to identify ancient populations that may have been at risk for HCAO. This work seeks to elucidate the epidemiology and the demographic distribution of these viruses in antiquity.

“Husbands' Traditionality and Wives' Well-being in Mexican American Families”

Presenter: Bonilla, Monsy

Co-Author(s): Yuliana Rodriguez, Jill Walls

Co-Presenter: Yuliana Rodriguez

Mentor: Heather Helms

Department: Human Development & Family Studies

In this investigation, we examined the link between husbands' traditionality and their wives' marital and personal well-being in 25 Mexican American couples in the early years of parenthood (i.e., firstborn child under the age of two). During home interviews, husbands and wives described their marriages, the extent to which they ascribed to gendered views about marriage and parenting, and their familiarity with and acceptance of various dimensions of Anglo and Latino culture. Analyses were conducted to: 1) examine the link between husbands' traditionality and wives' reports of marital quality and personal well-being, and 2) examine whether or not this link varied based on wives' acculturation. A negative relationship between husbands' traditionality and wives' well-being was hypothesized for wives' espousing an Anglo orientation, whereas we expected husbands' traditionality to be unrelated to wives' well-being for wives' with a Latino orientation.

"In the Long(ing) Run"

Presenter: Brown, Rachel

Mentor: Eluza Santos

Department: Dance

In the Longing Run was a collaborative choreographic project between Dr. Eluza Santos and Rachel Brown that explored the challenges of choreographing and performing "in-the-round", or for a performance space with audience members on four sides. This work was a combination of modern dance and capoeira forms, and explored the human feeling of desire and need. The challenges faced in the choreographic process included: performing to an audience "in-the-round" and conveying the emotions of "longing" without being cliché. The final work was performed in the Fall 2007 Departmental Dance Concert in the UNCG Dance Theater.

"Altered NF- κ B activity in folate deficient cells"

Presenter: Clute, Alexander

Co-Author: Karen Katula

Mentor: Karen Katula

Department: Biology

Folate is an essential vitamin that must be obtained from the diet. Metabolites of the folate pathway are required for nucleotide and amino acid biosynthesis. Folate deficiency has been associated with numerous human health problems including developmental defects, in particular spina bifida, cancer, and neurodegenerative diseases. The molecular basis for this link is unclear. In this study we analyzed the effect of folate deficiency on the transcription factor, NF- κ B. NF- κ B has been shown to be abnormally expressed in many cancers. A cell line containing a reporter for NF- κ B activity was grown in folate sufficient and deficient medium for 3, 6, and 9 days. The data indicates that NF- κ B activity increases at day 9. The same cell line was grown for 9 days in folate sufficient and deficient medium and were treated with and without an inducer of NF- κ B. Induction was found to be higher in folate deficient cells. We also explored if NF- κ B is involved in the expression of specific genes shown to be affected by folate deficiency. Results indicate that the genes are not regulated by NF- κ B. Overall, these data indicate that the health effects of folate deficiency may be due to an increase in NF- κ B activity.

“Music Perception in Primates: Bonobo Vocalizations”

Presenter: Daniels, Ryan

Mentor: Patricia Gray

Department: Music

The Bonobo, *Pan paniscus*, is the great ape species to which humans are most closely related and are an endangered species indigenous in the environs of the Democratic Republic of Congo. Bonobos share most of our DNA (99.797% of ours) and many of our social propensities, which make them a prime source for my research. This research project examines to look for parallels between spoken language and music. Working with a group of a language-competent bonobos at the Great Ape Trust in Des Moines, Iowa, the research focuses on analyzing bonobo vocalizations captured during exchanges between a human caretaker and Nyota, Panbanisha and Kanzi. of the *Pan paniscus* These are bonobos who have recorded with Paul McCartney and Peter Gabriel using synthesizers and who engage in musical activities by their own choice. Because the auditory range of *Pan paniscus* is not known, I am using sound analysis programs, such as CSL and Sound Forge, to track the bonobos' auditory range. These programs analytical tools also allowing for the enable manipulation to slow down the *Pan paniscus* vocalizations and to put the vocalizations' frequency range within the range of human perception. Patterns in vocalizations are also being examined to comprehend identify the *Pan paniscus* bonobos' musical constructions and patterns. language By examining musicality in Bonobo apes, we are expanding our understanding of the 'culture of the ear' while showing musical linkages in the evolution of language.

“Culture, Identity, and Belonging in Education”

Presenter: Downing, Ryan

Co-Author: David Kutas

Mentor: Beverly Faircloth

Department: Curriculum & Instruction

Many students in the American public education system are facing an identity crisis. They often see their identities and cultures as separate from the culture and identity of their school, leading to feelings of displacement and disconnectedness that can result in diminished efficiency and success. By recognizing, analyzing, and addressing this situation, we can work to reconnect students to their schools and work towards a more inclusive and successful education system. This study uncovers new ways of developing student identity through different approaches and activities, and evaluates student responses through interviews, questionnaires, and guided conversation. By conducting pre- and post-activity assessments with 12th grade high school English students, I was able to determine the efficacy of certain activities and pedagogical approaches. Through this research, I have learned that most high school students (with specific emphasis on minority students in lower-income schools) do not see a connection between their personal identity and the identity of their school. Specifically designing activities to demonstrate a connection between these identities can help students to become more empowered, active, and eager learners.

“How Green are Hotels in North Carolina?”

Presenter: Eggers, Peyton

Mentor: Jerrie Hsieh

Department: Recreation, Tourism & Hospitality Management

Environmental and sustainable management are major issues in our society, given the growing awareness of protecting our one and only earth. With the rapid growth of the hospitality industry, concerns continue to grow regarding the impact of hospitality operations on the natural environment. This has led to the designation of “green” hotels. Green hotels are properties whose managers are eager to institute programs to improve the environmental impact of their properties. An increasing number of hotel companies have committed themselves to “going green” through water conservation, energy efficiency, environmentally preferable purchasing, material substitutions, and general process improvements. There is little knowledge about the levels of implementation of green concepts at hotels in North Carolina. The purpose of this study is to bridge the information gap by conducting a best-practice survey to evaluate the environmental performance of the hotels in North Carolina. This study intends to establish the environmental performance of hotels in North Carolina. The results of this study will increase our understanding of the status of the green application in North Carolina’s lodging industry, raise hoteliers’ environmental awareness, and serve as scaffolding with which to help hotels improve their environmental performance. The findings of this study will assist environmental policy makers as they work towards future policies and plans. In addition, the data collected during this study can be used to apply for a potential grant to promote the increase of green hotels in North Carolina.

“Pirate Behavior! Two Models of Kleptoparasitic Organisms”

Presenter: Fitzgerald, Meghan

Co-Author: Jenny Yang

Co-Presenter: Jenny Yang

Mentor(s): Jan Rychtar, Dr. Mary Crowe, Dr. David Remington, Dr. Mark Broom

Department: Mathematics & Statistics

Kleptoparasitism, the stealing of food items and other resources, is a common biological phenomenon observed in a wide range of organisms including insects, fish, birds, and mammals. Two models of kleptoparasitic behavior, a stochastic model of finite populations based on food resource stealing in avian systems, and a game theoretical model of brood parasitism in dung beetles, will be presented. In both models kleptoparasitic behavior is described by the distribution of individuals exhibiting three types of behavior: searching, handling, and fighting or guarding resources. We will contrast the models, illustrating how two very different theoretical approaches must be used in order to gain insight into different aspects of the behavior.

“Mathematical modeling of resource allocation strategies in Arabidopsis Lyrata”

Presenter: Fogel, Rebecca

Co-Author: Robert Gove

Co-Presenter: Robert Gove

Mentor(s): David Remington, Jan Rychtar

Department: Biology

We are initiating studies using the rock cress plant, *Arabidopsis lyrata*, as a model organism to understand resource allocation between growth and maintenance versus reproductive output. We choose *A. lyrata* because it is a sister of the well-studied model plant *A. thaliana*, and both their genomes have been completely sequenced. Unlike *A. thaliana*, *A. lyrata* is a perennial with extensive variation in resource allocation strategies. Our goal is to construct models for how different genetic mechanisms affect growth and reproductive traits and how genetic variation in these mechanisms would result in different resource allocation strategies through their effects on networks of traits. We are further interested in how these strategies affect fitness in different environments. Possible modeling approaches will use network engineering and principal component analysis. We will use data from field and growth chamber studies using *A. lyrata* plants from four different populations: Mayodan, North Carolina (USA), Ithaca, New York (USA), Spiterstulen (Norway), and Plech (Germany). The eventual goal is to map the locations and determine the functions of genes that affect the trait networks.

“Neurotoxic manganese accumulation alters gene expression of neurotransmitter transport proteins.”

Presenter: Fordahl, Steven

Co-Author(s): Joel Anderson, Paula Cooney, Keith Erikson

Mentor: Keith Erikson

Department: Nutrition

Manganese (Mn) is a trace element essential to numerous reactions within the human body. However, when exposed to toxic amounts, via drinking water or airborne particulate, consequences manifest as neurological symptoms. Iron deficiency (ID), globally the largest nutritional deficiency, has been shown to exacerbate Mn accumulation in the brain, increasing concern of toxicity. It has been hypothesized that Mn accumulation in the basal ganglia is related to neurotransmitter transporter function. This study investigated the effect ID induced Mn accumulation had on gene expression of key transporters, γ -aminobutyric acid transporter-1 (GAT-1) and norepinephrine transporter (NET). Twenty-four Sprague-Dawley rats were randomly assigned to a control or ID diet, and either regular or Mn fortified water. Brain fractions harvested from the globus pallidus, caudate putamen (CP), hippocampus (HC), and locus ceruleus (LC) were processed and gene expression was quantified using real-time RT-PCR. Mn was shown to decrease expression of GAT-1 in the HC, CP, and LC ($p=0.023$, 0.020 , and ≤ 0.001 respectively) when coupled with ID. While Mn alone decreased GAT-1 expression in the LC ($p=0.003$), and increased NET expression ($p=0.047$). These data provide evidence that Mn neurotoxicity adjusts gene expression of essential transport proteins disturbing neurotransmitter uptake.

“The cellular activity of myosin II heavy chain kinase C form Dictyostelium discoideum is restricted by its WD-repeat domain.”

Presenter: Franklin, Atiya

Mentor: Paul Steimle

Department: Biology

Myosin II is a protein that drives contraction of the cell during critical cellular processes such as cell division, cell migration, and multicellular development. In Dictyostelium cells, myosin II exists in a dynamic equilibrium between inactive monomers found in the cytoplasm of the cell and cytoskeleton-associated filaments that can mediate cellular contraction. Myosin II heavy chain kinase-C (MHCK-C) catalyzes the disassembly of myosin II into monomers and serves as a negative regulator of myosin II function in the cell. For my studies I have examined the in vivo function of the WD-repeat domain of MHCK-C by over-expressing in Dictyostelium cells either full-length MHCK-C (MHCK-C++) or a truncated version of MHCK-C lacking the WD-repeat domain (MHCK-C-delta-WD++), and then assaying for myosin II-dependent activities such as cytokinesis and multicellular development. My studies revealed that MHCK-C++ cells exhibited cytokinesis defects with reduced growth in suspension culture and increased multinuclearity. MHCK-C-Δ-WD++ cells also do not proliferate in suspension culture; however, this growth defect is not accompanied by an increase in multinuclearity or decreased myosin II filament assembly. Together, these results suggest that under certain conditions, MHCK-C may exhibit activities outside of its known MHC kinase function in the cell.

“I am more than my mental illness”: Mental Health Patients' Experience of Being Misunderstood”

Presenter: Gaillard, Laura

Co-Author(s): Mona Shattell, Sandra Thomas

Mentor: Mona Shattell

Department: Nursing

Misunderstanding between patients and health care providers threatens therapeutic relationships that are essential to effective care. Persons with mental illness are vulnerable to misunderstandings as a result of stigmatization, marginalization, and other barriers to communication. The purpose of this study was to describe the experience of being misunderstood from the perspective of persons with mental illness. The research question was “what is the experience of being misunderstood?” This study was a secondary analysis of 20 nondirective, in-depth interviews with community-dwelling adults with mental illness, who were asked to talk about the experience of being understood by a healthcare provider. While the original study focused on the experience of being understood, misunderstanding was prevalent. An existential-phenomenological method was used to examine patients’ unique experiences. Four figural themes expressed the experiences of being misunderstood: “with each disclosure you open yourself to vulnerability”, “something broken that needs to be fixed”, “treated like a child”, and “it’s really frustrating”. Participants’ individual qualities were only recognized within the framework of their mental illness. Misunderstandings negatively affected participants’ self-esteem and progress in treatment.

“Children's Socioemotional Functioning and Maternal Psychopathology: The Moderating Role of Gender and Family Support”

Presenter: Garner, Brandon

Co-Author(s): Alysia Blandon, Susan Calkins

Mentor: Alysia Blandon

Department: Human Development & Family Studies

Maternal depression has been identified as one risk factor that increases the likelihood of adjustment problems and later psychopathology in children. This study examined the link between maternal psychopathology and 7-year-old children's negativity, externalizing, and internalizing behaviors. Research indicates there are individual differences in children's outcomes in the context of maternal depression, we will explore whether gender and family support (emotional and instrumental support) moderate the effect of maternal psychopathology on children's behavior problems. The current sample includes data from 330 children (45% male, 55% female) who are part of an ongoing longitudinal study. Participants in the 7 year study represent economically diverse backgrounds based on Hollingshead SES scores ($M = 44.78$, $SD = 11.77$). At the 7 year assessment, 67% were European American, 27% were African American, 4 % were biracial, and 2 % were Hispanic. Preliminary analyses indicate that boys and girls show significant differences in symptoms of ADHD, but there are no significant differences in their levels of internalizing and externalizing behaviors. Results indicated that higher levels of maternal depression are associated with children's exhibiting greater symptoms of negativity, ADHD, internalizing and externalizing behaviors. Instrumental family support was associated with lower externalizing behavior problems and greater emotional support was associated with greater child negativity.

“A Hawk-Dove Game in Finite Kleptoparasitic Populations”

Presenter: Grundman, Samuel

Co-Author(s): L. Koblizkova, Jan Rychtar

Mentor: Jan Rychtar

Department: Mathematics & Statistics

Kleptoparasitism, the stealing of food items, is a widespread biological phenomenon. In our research we extend earlier models of kleptoparasitism to investigate a finite population of individuals involved in foraging and, potentially, kleptoparasitism. We assume that the population consists of two types of individuals, Hawks and Doves. Hawks use every opportunity to steal and they also defend their food items. Doves never resist and never steal. We derive and study the stochastic model of this kleptoparasitic population. We compare the stochastic model with the deterministic model of a Hawk-Dove game in kleptoparasitic populations as well as with the abstract version of the Hawk-Dove game. We demonstrate that the outcome of the model depends upon various natural parameters, for example food density, the handling time of a food item, the size of the population, as well as the duration of potential fights over the food. The exact dependence on parameter values is much richer in stochastic description than in the deterministic version.

“Synthesis of Ligands to Catalyze the Production of Polymers”

Presenter: Hamoush, Hussam

Mentor: Jason Reddick

Department: Chemistry & Biochemistry

Our goal in this project was to develop new organometallic compounds which would act as catalysts for efficient and selective polymerization of polyethylene and polypropene. A catalyst is used to speed up the reaction in order to achieve the final product in a manageable time and without the production of excessive waste materials. Polymers are long-organic-chain molecules that are in proteins, DNA, as well as plastics. In order to achieve this goal, a series of ligands were synthesized which included a central pyridine ring and varied alkyl and aryl amine and imine substituents. In the future, these new ligands will be tested at the University of Bristol, UK, to see which will catalyze the production of different polymers.

“Synthesis of Novel Tridentate Nitrogen Ligands”

Presenter: Hamoush, Hussam

Mentor: Terence Nile

Department: Chemistry & Biochemistry

The synthesis of several novel tridentate ligands with three nitrogen donor atoms will be described. The new ligands were purified using a variety of techniques, such as recrystallization. Their structural identity was confirmed using proton nuclear magnetic resonance spectroscopy, NMR.

“Utilization of particulate and dissolved carbon sources by the snail *Valvata* in arctic lakes”

Presenter: Hayes, Danielle

Mentor: Anne Hershey

Department: Biology

Research was done to discover the uptake of dissolved organic carbon in *Valvata* using the stable isotope ^{13}C . *Valvata* is one of four snail species found in arctic Alaska. The assumed feeding strategy of the snails consists of grazing on algae and detritus and consuming suspended organic matter by filter-feeding. This experiment was set up to discover where the organisms derive their carbon food source. Organisms were placed in cores containing sediment from the bottom of the arctic lakes. Water placed on top of the sediment was changed weekly and contained one of 5 treatments: $1\text{-}^{13}\text{C}$ labeled acetate, $2\text{-}^{13}\text{C}$ labeled acetate, lake seston, no algal DOC (glacial water), and a control containing algal DOC water; DOC being dissolved organic carbon. After four weeks the snails were dried at 30 degrees Celsius, crushed and placed into tin capsules, and sent to the UC Davis laboratory for isotopic analysis. Results showed that the *Valvata* derived most of their DOC from the surrounding sediments rather than the water as the algal DOC treatment and acetate treatments showed the most ^{13}C uptake in the snails. This is important to understanding benthic invertebrates' roles in the microbial loop; the water cycle's micro- and macrobiotic food web.

“Identifying Novel Components of the Dtopors Chromosome Segregation Pathway”

Presenter: Hayworth, Miranda

Co-Author: Mohammad Rasool

Co-Presenter: Mohammad Rasool

Mentor: John Tomkiel

Department: Biology

The nuclear protein, Topors, has been implicated in a variety of human cancers. We are studying the homologous gene (Dtopors) in the fruit fly, *Drosophila melanogaster*, to gain insight into its function. A mutation in Dtopors results in abnormalities in meiosis including disruption of the nuclear membrane, defects in centriole division, and perturbation proper chromosome segregation. The Topors protein is a member of a family of Sumo and Ubiquitin ligases. This family of proteins is involved in the modification of proteins to alter their function or to target them for destruction. We have designed a genetic scheme to identify genes in the Topors pathway based on suppression of male sterility caused by mutations in Dtopors. We have identified eight mutations that restore fertility to Dtopors mutants. Currently, we are mapping these mutations to identify the genes involved in the suppression of sterility and will cytologically characterize their effects. We expect that some or all of these Topors modifiers will identify new members of conserved pathways involved in tumorigenesis and provide insight into the possible role of Topors in cancer.

“The Reproductive Game Plan of Honeybee Queens”

Presenter: Hayworth, Miranda

Co-Author(s): Nathan Ross, Matthew Wilhelm, Robert Gove, Megan Leagon

Mentor: Olav Rueppell

Department: Biology

Among reproductive strategies, polyandry (multiple mating by females but not by males) is very rare. Nonetheless, honeybee queens are exceptionally polyandrous. In the first week of life, queens go on 1-5 mating flights, during which they mate with up to 45 drones. Numerous hypotheses address the benefits of multiple mating, whereas the fitness costs experienced during the mating flights have not been addressed. In this project, we investigated how queens adjust their mating behavior in response to the perceived cost of mating. We experimentally compared the mating effort in terms of the number of mating flights and total flight duration and mating success in terms of quantity of sperm stored and mating number of queens carrying lead weights to unweighted queens. Our results show that weighted queens shortened their mating flights and went on less mating flights than the unweighted queens. In addition, the amount of sperm was not significantly different between experimental groups. However, the increase in mating costs lead to a decrease in the number of mates per queen. This demonstrates that honeybee queens are risk-sensitive and capable of adjusting their mating behavior in response to the trade-off between the costs and benefits of multiple mating.

“Islamic Veiling, Adolescent and Young Adult Experiences: France and a Warning about Intolerance”

Presenter: Heston, Kevin

Mentor: Elizabeth Bucar

Department: Religious Studies

In Egypt the relief of anxiety women express upon donning the veil is accompanied by an acceptance of resurgent veiling by the dominant secular culture. This is in sharp contrast to first and second generation Muslim adolescent and young women living in France. To non-Muslim American and European citizens the veil is elevated to a symbol of repression and cultural exoticism. This plus the limited dialogue between the Islamic societies and these non-Muslim citizens limits cross-cultural understanding. In a double-bind crisis the adolescent French Muslims are excluded from the dominant French society because of misconceptions about their "exotic" ancestry; and refused a compensating identity as they are instructed to remove their veils. Veils they donned in a non-violent, non-proselytizing, and non-organized adolescent indentation process. The headlines and statements of state recognized experts and authorities (including Chirac at the very top) created a hysterical affront in the dialogue between the French tradition and the Muslim struggle for a new compensating identity. The reactive rather than balanced response risks that these girls will become leaders of pro-Muslim exclusivity rather than assimilated French citizens of Muslim ancestry. The French have all but guaranteed precisely what policy was designed to combat, cultural heterogeneity.

“Diffraction of Wave in Non-uniform Medium”

Presenter: Hoang, Thai

Mentor: Maya Chhetri

Department: Mathematics & Statistics

We study the diffraction of electromagnetic wave (for example, light, X-ray, gamma-ray, microwave, radio wave) propagating through a non-uniform medium (permittivity of the medium of the medium is not constant). In particular, we study the fraction of wave that gets transmitted and reflected passing through a non-uniform medium. Diffraction of electromagnetic wave in a uniform medium is well known but not known for the case of non-uniform medium. Our method involves dividing the non-uniform medium into thin layer of mediums. We assume that each layer is uniform and apply the known result to calculate the diffraction in the non-uniform medium by assuming appropriate boundary conditions between each layer.

“Effect of psychological status on exercise program drop-out in overweight and obese young women”

Presenter: Holmes, Maia

Co-Author: Jennifer Gapin

Mentor(s): Paul Davis, Jennifer Etnier

Department: Exercise & Sport Science

Women are generally less physically active than men. During early adulthood, a woman’s leisure-time physical activity may decline due to increased educational, occupational, and/or family commitments. In overweight and obese women, psychological factors often associated with body weight [e.g., depression, general feelings of well-being, low exercise self-efficacy (perception of ability to succeed in an exercise program), etc.] may serve as further barriers to physical activity. Therefore, the primary objective of this study is to investigate the effects of selected psychological variables on drop-out from a structured moderate-intensity exercise program in overweight and obese young women (age 18-30). Data will be analyzed from a study designed to investigate the effect of 6 months of moderate-intensity exercise (either 30 or 60 minutes per day, 5 days per week) on cardiovascular disease and diabetes risk factors. Various psychological factors at the beginning of the exercise program will be compared between women completing the program and those who dropped out. Eighty percent of the exercise sessions were required for a participant to remain in the study. Results from this study shall benefit both researchers and clinicians prescribing exercise to overweight and obese young women.

“Visualizing the Triad's Immigrant Community: a visual content analysis of the Greensboro News and Record 1965 to present”

Presenter: Horton, Jennifer

Mentor: Stephen Sills

Department: Sociology

The debate over immigration and immigration reform has been shaped by the media's portrayal of immigrants. This portrayal has often reified popular stereotypes leading to misconceptions of who migrants are and why they are here. This presentation will focus on preliminary findings from an ongoing visual content analysis of images of immigrants found in the Greensboro News and Records . Using the methods of Visual Sociology, the researchers hope to gain a better understanding of how the local media both shapes and reflects the dominant discourses on immigration. The project has developed an online database of images by systematically reviewing daily newspapers for images of immigrants. These images are then analyzed, using a combination of inductive coding strategies (akin to Grounded Theory Method). Patterns, trends, and associations emerge from the constant comparison between images. Images are also tied to the major social and political happenings of the times to see how they are used to illustrate current events. Comparisons are then made between these intended messages of the images (their connotation) and the unintended or hiding messages contained within them (denotation).

ABSTRACT

“Analysis of the EPHB6 promoter and its activity in folate deficient cells.”

Presenter: Kuk, Amber

Mentor: Karen Katula

Department: Biology

EphB6 is a member of the Eph receptor tyrosine kinase family. It is involved in cell signaling during development and differentiation. EphB6 mRNA levels were shown to be increased in folate deficient cells. In this study we cloned the EphB6 promoter and analyzed its regulation with the goal of understanding why EphB6 expression is altered in folate deficient cells. EphB6 promoter sequences were amplified from genomic DNA and cloned into a luciferase reporter. Transient transfection analysis indicated that 420 bp of EphB6 upstream sequence is sufficient for maximal activity. Promoter activity of a construct containing 934 bp of upstream was shown to increase in folate deficient cells. Different inhibitors were tested for their effects on EphB6 promoter activity. A Ras pathway inhibitor U0126 and methotrexate decreased EphB6 promoter activity. A protein methylation inhibitor and a PKC inhibitor had little or no effect on promoter activity. These findings indicate that the increase in EphB6 expression in folate deficient cells does not involve Ras and PKC signaling pathways or alterations in protein methylation. It is likely that the increase is not directly linked to the folate pathway but is a secondary effect due to prolonged culture in folate deficient medium.

“Accessing culture to include students”

Presenter: Kutas, David

Mentor: Beverly Faircloth

Department: Education

The framework of this research is Beverly Faircloth's work on adolescents' sense of belonging in the student's overall Education. The intention of this, the cultural wing of the research, is to envision elements of cultural inclusion that can be conducted within the classroom. Themes of exercises include: shaping of momentary student thinking to be available to open-ended questions regarding character identification and how some literary themes run parallel to their own lives; immersion of students into microcosmic presentations of setting that will yield responses to questions that deal with perceived resource availability and perceived favoritism within the student body. Post-exercise conversations and some post-exercise writings will for the qualitative side of this effort; quantitative calculations will also be conducted with the option of directly supporting the theories garnered from the qualitative research or augmenting the research questions in such a way that greater direct access to students' sense of belonging is permitted.

“SYNTHESIS OF CHIRAL PYRIDINIUM SALTS AND EVALUATION AS SUBSTRATES FOR RABBIT LIVER ALDEHYDE OXIDASE.”

Presenter: Lanning, Maryanna

Mentor: Robert Banks

Department: Chemistry & Biochemistry

Aldehyde oxidase is a molybdenum-containing enzyme present in the liver and other organs of humans and other mammals. The enzyme catalyzes oxidation reactions which are important in the metabolism of drugs and other foreign compounds. Some of the molecules oxidized by aldehyde oxidase are chiral - i.e., they have “handedness” and their structures exist as nonsuperimposable mirror images, or enantiomers. Since the therapeutic activity of many drugs is found primarily in one enantiomer or “hand”, it is important to define the enantiomeric preference of drug metabolizing enzymes. In this project we are synthesizing chiral compounds containing the pyridinium ring system and evaluating them as substrates for rabbit liver aldehyde oxidase. Zincke salts obtained from nicotinamide have been reacted with chiral amines, such as α -methylbenzylamine to produce chiral alkylnicotinium compounds. The chiral selectivity of aldehyde oxidase will be measured using purified R- and S-enantiomers of these pyridinium substrates. Data obtained from the experiments will help to determine whether aldehyde oxidase is selective in the oxidation of enantiomeric substrates.

“Relationship Between Hip Strength and Dynamic Motion”

Presenter: Lemyre, Katherine

Co-Author(s): Sandra J. Shultz, John Cone

Mentor: Anh-Dung Nguyen

Department: Exercise & Sport Science

Functional valgus collapse (i.e. an inward knee collapse) has been commonly observed as a mechanism for anterior cruciate ligament (ACL) injury during jumping activities. However, reasons contributing to this valgus collapse are unclear. Hip strength is thought to be a risk factor for ACL injury, and may be a factor in controlling knee motions during functional activities. Therefore, the purpose of our study was to examine the relationship between hip strength measures and lower extremity dynamic motion during a drop-jump task. Forty healthy collegiate aged participants with no current history of injury to the lower extremity, or any previous history that would affect the motion of lower extremity joints participated in this study in a controlled, laboratory setting. Hip abduction (standing, hip abducted 5°), external rotation (semi-reclined, hip flexed 40°, knee flexed 90°) and extension (supine, hip flexed 90°) torques were measured during maximal isometric voluntary contractions with an isokinetic dynamometer. Three-dimensional kinematic joint motions of the hip and knee were then ascertained via an electromagnetic tracking system during a 45cm drop-jump landing.

“Molecular Characterization Of Parasitic Flies Of Two Different Bee Species”

Presenter: Luzon, Javier

Co-Author(s): Gudrun Koeniger, Salim Tingek, Michael Gries, Nikolaus Koeniger

Mentor: Olav Rueppell

Department: Biology

Two different Asian honey bee species have been reported to be attacked by a Dipteran parasitoid: The flies lay their eggs in the bee's abdomen, a larvae hatches, and the host dies after larval development is complete. The parasitoids kill a significant percentage of bees in the affected colonies, regardless of species. This newly discovered fly is unknown and its phylogenic study under process. Our goal is to investigate the molecular differentiation between flies that infect the cave-nesting bees *Apis cerana* and the giant honeybees, *Apis dorsata*. Mitochondrial DNA variation will be studied to investigate reproductive isolation between flies collected from these two host species in the same area. The screening of primers for mitochondrial DNA amplification is currently under progress. The amplificate will be sequenced and the sequences from individual flies compared. From its practical significance, the classification of this new parasite can help beekeepers reduce the possibility of transferring the parasite to other countries with a similar climate. From its theoretical significance, this study can help us better understand the mechanisms of speciation from this parasitoid, allowing for more complex studies in the future.

“Childhood invalidation can be used to predict symptoms of some Cluster B personality disorders”

Presenter: Marcinowski, Emily

Mentor: Rosemary Nelson-Gray

Department: Psychology

The study sought to confirm the relationship between Cluster B Personality Disorders and the invalidating childhood environment. Both Borderline Personality Disorder (BPD) and Antisocial Personality Disorder (APD) have been related to emotional dysregulation, which is thought to result from childhood parental invalidation (Linehan, 1993; Newhill, & Mulvey, 2002). The relationship between childhood invalidation and all four of the Cluster B personality disorders were examined. The participants were all female college students (n=64) who completed the Invalidating Childhood Environment Scale (ICES) and the Wisconsin Personality Disorders Inventory (WISPI). It was predicted that increased symptoms of BPD and APD would be related to increased childhood invalidation. To test this hypothesis a regression was performed with demographic variables in step one of the model (SES and age) and parental invalidation (maternal and paternal) in the second step. With BPD as the dependent variable, the overall model was significant and accounted for 14.9% of the variance in BPD ($F(4,62)=2.709, p=.038$). With APD as the dependent variable, the overall model was also significant ($F(4,62)=2.591, p=.045$). Surprisingly, Narcissistic Personality Disorder was significantly predicted by the overall model as well ($F(4,62)=2.824, p=.033$), with paternal invalidation making a significant contribution in the second step ($B=.371 ; p=.019$). These results support the theory that the invalidating childhood environment is a factor in etiology of Cluster B Personality Disorders.

“Checking Sentence Structure Using Computational Linguistics”

Presenter: McCormick, Lauren

Co-Author: Robert Gove

Mentor: Jan Rychtar

Department: Mathematics & Statistics

Humans see a sentence and intuitively know whether it is part of a language or not, and we want know if a computer can make the same decision. First we define that a sentence belongs to a language if it can be generated by that language's grammar, which is a set of syntax rules. We show how to check whether a sentence belongs to a language by generating its parse tree. Furthermore, we present a parsing algorithm that generates the parse tree and thus allows a computer to decide whether a sentence matches the syntax of a language or not. This algorithm is robust in the sense that it can be applied to a wide variety of grammars, including natural languages like English, RNA sequences in genetics, and Morse code. We show that a sentence may match a language's syntax but not fit the language's semantics. We conclude that computers can decide whether a sentence belongs to a language syntactically, but it is significantly more difficult for a computer to check if it belongs semantically.

“BRIGHT (Building Relationships Involves Growing Healthy Together)”

Presenter: Miller, Yalonda

Co-Author(s): Neda Padilla, Danielle Durham

Mentor: Tracy Nichols

Department: Public Health Education

Mothers and daughters often find it difficult to talk to each other about the health concerns and developmental changes that come with adolescence. Learning and understanding mother-daughter relationships, their views on health issues and how these views change, will aid in the development of effective and meaningful health promotion interventions for families. BRIGHT (Building Relationships Involves Growing Healthy Together) studies how mothers and daughters think about their personal health, their family health, and the positive or negative health habits or activities in their lives. Adolescence can be tough, and we want to provide a way for moms and daughters to work together to keep each other healthy and maintain a healthy relationship through this challenging period. Through one-on-one interviews with moms and their daughters, we examined their relationships; the dynamics of their relationship, and changes experienced in their relationship. By understanding these aspects of everyday life and uncovering themes presented in the interviews, we can create programs that are salient for both mothers and daughters. Pilot materials will be developed and presented to moms and daughters in focus groups to assess their relevance and potential impact.

“Genetic and domestication effects on honeybee worker ovary size”

Presenter: Munday, Michael

Co-Author(s): O. Rueppell, R. Cargel, and T. Rinderer

Mentor: Olav Rueppell

Department: Biology

The ovary of the honeybee (*Apis mellifera*) is believed to be an important determining factor of several aspects of the honeybee worker's life, including what it forages for and its brood care behavior (Amdam et al. 2006). Having noticed that the ovaries of non-domesticated Africanized honeybees are, in general, larger than their domesticated European counterpart, we studied the ovary size of the non-domesticated Russian honeybees in comparison to European stocks. We used 18 different Russian sources to test for a genetic differentiation within Russian honeybees. Newly emerged workers from different hives were placed in four experimental hives where they were allowed to mature. These bees were taken out of the hive after a month and were dissected to measure ovary size by counting the number of ovarioles on both ovary sides. In agreement with our expectation, the non-domesticated Russian honeybees showed a larger ovary size than the European comparison. Furthermore, we found that bees from the same source had similar ovary sizes, which suggests a genetic effect on worker ovary size in honeybees. In conclusion, domestication of the European honeybees may have selected for smaller worker ovary sizes, potentially indirectly via selection on nectar collection.

“Are the golden years always golden?”

Presenter: Nickerson, Joscelyn

Mentor: Melissa Taylor, John Rife

Department: Social Work

This is a Community Based Research Project assessing the needs and strengths of the elderly “Montagnard” refugees from Vietnam, now residing in Greensboro, NC. These elderly Montagnards, who can neither read nor write in any language, and can not speak English, were classified as disabled when they arrived as refugees in the United States, and were consequently given Social Security (SSI) benefits. These benefits were rescinded because they did not become citizens, leaving them with no income. Consequently, the Montagnard elders have been struggling with financial and related gaps in their community. To ascertain the scope of this problem and identify possible resources for amelioration the researchers are conducting interviews with approximately ten Montagnard Elders in Greensboro. Further goals of the research are to disseminate the results to legislative bodies and advocacy organizations in order to bring this issue to their attention and work together to protect this vulnerable population.

“A Social Model for Tuberculosis Control”

Presenter: Noble, Ezra

Mentor: Joan Paluzzi

Department: Anthropology

Tuberculosis remains one of the leading causes of mortality worldwide. The HIV pandemic and the emergence of multidrug-resistant TB (MDR-TB) remain major obstacles to controlling the tuberculosis pandemic. In recent years, innovative community-based tuberculosis control programs have emerged, sensitive to the socioeconomic contexts that create both vulnerability to the disease and obstacles to effective interventions. The epidemiological data now available from these programs presents evidence of their superior effectiveness when compared to the current treatment model utilized in most developing countries. This presentation compares the critical elements and treatment outcomes between community-based systems and more traditional, centralized care models. This social model for tuberculosis control reflects current biomedical practice as well as the features that characterize innovative and successful control programs in highly impoverished settings.

“Community Support for African Immigrant Adaptation Stressors and Mental Well-being”

Presenter: Osman, Ekathrina

Co-Author: Sammie Autry

Mentor: Sharon Morrison

Department: Public Health Education

The Piedmont Triad of Central North Carolina has become one of the new gateway regions attracting economic immigrants from East and West Africa, and for the resettlement of refugee families and individuals escaping war, political conflict, or religious persecution in Central and Sub-Saharan Africa. These newcomer populations face a time of “settling in” that comes with a unique set of stressors – finding a job, learning a new language and culture, and enrolling kids in daycare and school, and dealing with a new health care system that may conflict with traditional beliefs. These adaptation stressors may negatively impact mental health and overall well-being. The primary goal of this project is to profile community-based support and assistance for adaptation stress and mental health promotion among African immigrant newcomers. The specific objectives are to (1) identify through content analysis of published literature and web-sites, key methods or strategies being used by organizations, groups, or agencies in the country working with African immigrant/refugee adaptation issues, and (2) develop a conceptual map the strengths and challenges that could provide insight for addressing mental health promotion among African immigrant and refugee communities in the Triad community.

“Women's Ways, Women's Days”

Presenter: Padilla, Neda

Co-Author(s): Dr. Nichols, Yalonda Miller, Harmony Waller

Co-Presenter: Yalonda Miller

Mentor: Tracy Nichols

Department: Public Health Education

Women's Ways, Women's Days is a study designed to understand how mothers perceive their daily lives and how their day-to-day activities relate to their health. In families mothers many times fulfill the role of healthcare providers and decision-makers while frequently making their own health concerns lower priorities than their families. Women's Ways, Women's Days looks at the challenges mothers face while caring for themselves and others, it identifies strategies women use to meet the challenges and understands the context in which mothers' daily health activities occur as well as the type of health-related programs they feel are pertinent, helpful and feasible. The study is structured in a series of one-on-one interviews and small focus groups where mothers discuss health-related needs and experiences. Daily health practices and moods are assessed through electronic daily diaries. Through understanding aspects of mothers' everyday lives and their relation to their healthcare we can create relevant health education programs for mothers. Pilot materials will be developed and presented to mothers in focus groups to assess their relevance and potential impact.

“Exploring Tissue Specific Functions of the Ecdysteroid Receptor in the Fruit Fly *Drosophila melanogaster*”

Presenter: Plotkin, Jesse

Mentor: Vincent Henrich

Department: Biology

Insect development is controlled in large part by the steroid hormone Ecdysone and its receptor, the Ecdysteroid Receptor. This receptor consists of a complex of two proteins: one of three isoforms of the Ecdysone Receptor (EcR) and Ultraspiracle. The basic mechanism by which Ecdysone and its receptor control development is well understood. Very briefly, the hormone molecule binds the receptor which controls the activity of specific genes. However, this model leaves one wanting as an explanatory model for the very high degree of regulatory complexity that this hormone is able to elicit. A great deal of effort has been put forth in an effort to reconcile the apparent simplicity of the mechanism with the high degree of complexity of the outcome. Previous studies using an engineered form of USP which was unable to bind DNA, but retained the ability to associate with EcR, showed that the Ecdysteroid Receptor behaves in separate and specific manners when different isoforms of EcR are used to make it up. This observation was instrumental in providing a framework for understanding the true nature of this system and laid the groundwork for future investigation. The study to be presented here is using this difference to begin to dissect out specific functions of this receptor in a physiological context.

ABSTRACT

“Research in the Street: An asset based assessment of injecting drug users’ harm reduction needs.”

Presenter: Poillot, Melissa

Co-Author (s): Erin Balkind, Stephen Daniels, Caroline Moseley, Terri Shelton

Co-Presenter (s): Caroline Moseley and Stephen Daniels

Mentor(s): Caroline Moseley, Terri Shelton

Department: Public Health Education

Friedman et al. (2006) estimated that there are 5,000 injecting drug users living in the triad area. Based on CDC prevalence estimates for HIV and HCV infection related to injection drug use, up to as many as 1,000 and 4,500 injectors be infected, (respectively). This burden of disease and its related health outcomes demand emergency measures to reduce the spread of blood borne pathogens. To date, the most effective means of such a reduction is syringe exchange. This study examined the current needs of injecting drug users in the Guilford County area that are not being met and that the exchange might be able to offer. Injecting drug users contributed to this research in two phases. A small group helped develop the survey by answering formative questions about the exchange and its services. The second phase of the research involved conducting a survey based on the questions considered important to the first group of injectors. The results were then presented to the staff and board of the exchange for recommendation development. Even though it is beyond the scope of the project, the exchange intends to use the information to better individualize its services to the population it serves.

“Impact Of Volunteering”

Presenter: Poole, Sara E.

Mentor(s): Stuart J. Schleien, Kim Miller

Department: Recreation, Tourism & Hospitality Management

Research supports numerous benefits experienced by those who volunteer including a greater sense of control over life, increased self-esteem, happiness, satisfaction, and health, increased social awareness and concern for others, increased personal confidence, a sense of responsibility, and the ability to make decisions, an ability to help those in need, become involved in the community, work towards social justice, increase in knowledge of the community, and meet new people. Based on this evidence, the following research questions were formulated: 1) What impact does an Adopt-A-Park project have on volunteers? 2) What impact does an Adopt-A-Park project have on community members? 3) What partnerships could the Adopt-A-Park program develop to further impact community capacity? A case study approach will be used. Data will be collected between August of 2007 and February of 2008 on volunteers of the Recreation, Tourism, and Hospitality Club’s Adopt-A-Park project which included students of UNCG, members of the Glenwood neighborhood where the park is located, and community members. Data collection will be through short answer questionnaires, in-depth interviews, focus groups, informal communications, field notes, photographs, cassette recordings, program documents, and a review of historical records. Data will be analyzed through the use of constant-comparative methods, involving identifying, coding, categorizing, classifying, and labeling primary patterns in the data.

“Family literacy in teen families: Knowledge, beliefs, and practices about everyday nutrition”

Presenter: Pyle-DeFiglia, Toni

Mentor(s): Eva Nwokah, Margaret Savoca

Department: Communication Sciences & Disorders

Teen families often have limited knowledge of nutrition and early development of feeding in young children. Poor nutritional choices by these parents for themselves and their children have serious long term implications for the health of teen families. Knowledge of nutrition is also impacted by low literacy. This project is a both a needs-based assessment and intervention approach. Observation and evaluation of knowledge is followed by three classes on food preparation and nutrition awareness for ten mothers with low literacy skills. Literacy skills in teen mothers are evaluated prior to the classes. The methods and materials are modified to match their reading levels. This is an interdisciplinary project with four different departments at UNCG.

“Role of Naringenin in Breast Cancer Metastasis”

Presenter: Ramos, Joseph

Mentor: Yashomati Patel

Department: Biology

Breast cancer is one of the most common forms of cancer in women. Over 200,000 new cases of breast cancer are diagnosed in America every year, thus the need for more effective treatments is critical. The development and progression of breast cancer is a highly complex process involving unregulated cellular growth (tumor formation) and cell migration (metastasis). Thus the identification and characterization of compounds that regulate this processes is critical in understanding the development and progression of mammary tumorigenesis and could serve as a pharmacological target. Our previous studies have shown that the grapefruit flavanone naringenin inhibits phosphoinositol 3 kinase, a critical factor required for cell migration. The goal of this study was to determine whether naringenin inhibits cell migration of breast cancer cells and thus breast cancer tumor metastasis. In order to determine the role of naringenin in cell migration, I employed the well characterized breast cancer cell model, MCF-7. Using fluorescent microscopy, my results show that naringenin treatment significantly impaired MCF-7 cellular migration when compared to untreated cells. The results of these studies have important implications for the understanding of breast cancer metastasis and for possible avenues of treatment using dietary compounds.

“Feeding Assessment in Infants and Toddlers Birth to Three Years”

Presenter: Reed, Renee

Co-Author(s): Leslie Bailey, Joanne Caballero, Gina Childress, Jodi Ingold, Lindsay Parker, Sandra Sturgill, Lauren Vater

Mentor(s): Virginia Hinton, Amie Teague

Department: Communication Sciences & Disorders

This study was designed to help form a standardized assessment tool to help diagnose feeding disorders in infants and toddlers from birth to three years of age. Typically developing children were tested for specific oral-motor skills that have been noted to develop at certain ages. Using gloved figures, the researchers completed a six step oral-motor exam that tested for skills involving the strength, movement and reflexes of the oral muscles. They then watched the infants or toddlers eat and drink watching for such skills as sucking, particular jaw movements when chewing, regular breathing while drinking or sucking, and the control of food and drink and with the tongue and other oral muscles. Requirements to pass the assessment depended on the age of the child with requirement varying between the ages of 0-4 months, 4-6 months, 6-9 months, 9-12 months, 12-18 months, 18-24 months, and 24-36 months. The research recorded observed skills the assessment form. The entire evaluation for each child was videotaped and reviewed by or performed in the presence of a speech-language pathologist (SLP) specializing in oral-motor development. The SLP and the researcher had to agree with the observations before the data was could be used.

“Spectral characteristics of ultrasonic vocalizations”

Presenter: Rodriguez Fuentes, Grisel

Mentor: Matina Kalcounis-Ruppell

Department: Biology

In the laboratory, many species of muroid rodents (rats, voles, mice, hamsters) produce a wide array of ultrasonic vocalizations (USVs). Although we typically think of olfactory communication as being prevalent among rodents, it is becoming clear that vocal signals probably constitute an underappreciated component of their behavior. One of the hypotheses to explain the production of USVs in muroid rodents is that they might function as communication signals during the mating season. If our hypothesis is correct and the USVs of muroid rodents serve a mating function, there should be differences in USV types in, and out, of the mating season. The objective of this study was to examine USV recordings from prairie voles (*Microtus ochrogaster*) in, and out, of the mating season. We predicted that if there is a mating function for muroid USVs, we will find spectral characteristics of the USVs that differ in, and out, of the mating season. We will compare spectral characteristics by 1) examining differences in the overall USV motif type used by voles in, and out, of the mating season, and 2) comparing spectral characters between USVs produced in, and out, of the mating season. Preliminary results clearly demonstrate a difference in USV rate and structure in, and out, of the mating season.

“Mathematical model on the relationship between oyster reef system and the fish population in coastal ecosystems”

Presenter: Roop, Amy

Mentor: Maya Chhetri

Department: Mathematics & Statistics

Previous studies have shown that healthy oyster reef populations have a positive effect on fish populations (“Ecosystem Services Related to Oyster Restoration”, Coen et al., 2003). The harvesting of both oysters and fish are economically important to humans. Oyster reefs are negatively affected due to both human and natural impacts. Human impacts can include but are not limited to over harvesting/dredging and increases in pollution. The ecological sustainability of these oyster and fish populations is the key to maintaining economic sustainability of harvesting. It has been suggested that the detrimental effect of human impact may be reversed by stocking oyster into the environment. We would like to discuss mathematical model that explains the relationship between oyster reef system and fish populations in southeastern coastal regions. We also wish to explore the impact of oyster stocking on the fish population. We will determine the regions of parameters for which the co-existence of stable carrying capacity is guaranteed. We will use previously collected data to test our mathematical model as well.

“A New Direction in Natural Medicinal Remedies: The Inhibition of Cytochrome P450 2E1 by the Eucalyptus Essential Oil”

Presenter: Ryan, Katherine

Mentor: Greg Raner

Department: Chemistry & Biochemistry

In recent studies, the human liver cytochrome P450 2E1 has been implicated in the oxidative stress brought on by alcohol consumption, as well as the hepatotoxic and carcinogenic effects associated with the metabolism of acetaminophen (Tylenol), and N,N-dimethylnitrosamine, a component of cigarette smoke. Furthermore, so called “knockout” experiments in rats (the P450 2E1 gene is eliminated from the animal genetically) have shown that loss of 2E1 activity has no apparent detrimental effects on the animal. These discoveries have led to the current investigation of natural products in an attempt to identify compounds that may inhibit cytochrome P450 2E1 activity, as a therapeutic strategy to reduce the oxidative stress brought on by cytochrome P450 2E1 dependent processes. This project involved the initial screening of 64 different commonly used essential oils for their ability to inhibit the oxidation of p-nitrophenol by human liver tissue samples in vitro. The essential oil, eucalyptus globulus, has been isolated as a very potent inhibitor of the enzyme, and was the focus of the following investigation. Both the potency and mechanism of inhibition of P450 2E1 by eucalyptus and its main constituent, 1,8 cineole were probed.

“Effect of exercise training amount on blood adiponectin in overweight and obese young women”

Presenter: Sawyer, Catherine

Co-Author: Charles Robison

Mentor: Paul Davis

Department: Exercise & Sport Science

Adiponectin, a protein released from fat tissue, has protective effects against both cardiovascular disease and diabetes. People with higher levels of body fat typically have lower concentrations of adiponectin in the blood. In addition, some studies have shown adiponectin to increase with weight loss. The purpose of this study is to examine the effect of exercise amount on blood adiponectin levels in overweight and obese young women (age 18-30). Participants were randomly assigned to either 30 or 60 minutes of moderate-intensity exercise (5 days per week) for 6 months or a non-exercising control group. Fasted blood samples were obtained at the beginning and end of the study. Changes in adiponectin concentrations will be compared across the three study groups. In addition, adiponectin concentrations will be compared to other variables (e.g., cholesterol) known to affect cardiovascular health. As this study focuses on overweight and obese young women, it will produce important results regarding the effect of exercise dose on metabolic health in a potentially high-risk group that has not been extensively studied in the past.

“The Effect of Temperature and Floral Reflectance Plasticity on Pollen Grain Size in *Plantago lanceolata*”

Presenter: Schmidt, Deanna

Mentor: Elizabeth Lacey

Department: Biology

Data strongly support the hypothesis that phenotypic plasticity in floral reflectance plays a role in the thermoregulation of reproduction in *Plantago lanceolata*, a weedy herbaceous perennial. Individual plants produce poorly reflective flowers in the cool spring and autumn but highly reflective flowers in the warm summer. It is possible that the phenotypic plasticity in floral reflectance is adaptive because the warming of the male sex organs in flowers at cool ambient temperatures improves male function and improves offspring fitness. To test this hypothesis we are measuring the effect of temperature and floral reflectance plasticity on pollen grain size in *P. lanceolata*. Pollen was collected from cloned 28 genotypes producing flowers in both warm- and cool-temperature growth chambers. Pollen diameter was measured using a micrometer on a compound light microscope. Data have been collected and are currently being statistically analyzed. The results will be presented.

“Creating a Reference Recording of Mark Engebretson's "Five Songs of Passion”

Presenter: Sherouse, Braxton

Mentor: Mark Engebretson

Department: Music

Professional recordings are invaluable resources for the representation and distribution of the music of contemporary composers. Beyond their immediate aesthetic value to listeners, these recordings represent the composer's artistic vision for their work, allowing fellow composers and potential future performers to evaluate the work in an ideal context. Through the support of an Undergraduate Research Assistantship, I assembled a reference recording of Mark Engebretson's work "Five Songs of Passion", composed for and performed by the EastWind Ensemble. In particular, my tasks involved the critical listening and assembly of more than three hours of recorded materials into the final form, a sixteen minute long mastered recording suitable for publication. While certain objective criteria were set (removal of extraneous noises, etc.), the process was largely a creative endeavor; in selecting and compositing single moments from hours of recordings, I acted as an extension of Engebretson's creative process, sculpting a fixed version of his work. This recording will form a substantial portion of an upcoming compact disc of Engebretson's compositions.

“Characterization of signaling between embryos of the orchid, *Dactylorhiza maculata*, and the soil fungus, *Rhizoctonia stahlia*.”

Presenter: Sirkisoon, Sherona

Mentor: LaJeunesse Dennis

Department: Biology

Orchids are the largest and most successful group of flowering plants with over 25,000 different species. Orchid seeds lack any nutritive endosperm and must rely on a specific symbiotic interaction with a soil fungus to provide the essential sugars that promote and facilitate germination. Oftentimes, the orchid/fungal relationship is species specific. We have characterized some of the cellular and intracellular changes that occur between the symbiotic fungus *Rhizoctonia stahlia* and the seeds of the terrestrial orchid *Dactylorhiza maculata* during the germination. The fungus does not kill the orchid seed, but rather infects a select group of cells within the orchid embryo to foster germination and growth by transferring nutrients to the orchid embryo. We are testing whether the orchid seed itself controls aspects of fungal growth, by examining the effect that the seed has on fungal branching. Although never described in fungal/orchid seed interaction before, signaling between plant and soil fungus is not novel. Arbuscular mycorrhizal fungi respond to branching factors that are released by the plant's roots. Branching factors have been shown to contain chemicals called strigolactones that alter fungal branching morphology and it remains to be seen whether orchids seeds secrete a similar compounds to control fungal growth.

“Early Childhood Teachers' Career Goals and Beliefs”

Presenter: Smith, Airreia

Co-Author: Kathy Siepak

Mentor: Karen LaParo

Department: Human Development & Family Studies

Approximately 26% to 41% child care teachers leave the childhood field each year (Manlove, 1997). This high rate of teacher turnover has negative outcomes for the children, including lower competency in language and social skills (Whitebook, 1999). Using teacher interviews from the NICHD Study of Early Child Care data base, we will analyze teachers' responses to a questionnaire focused on career choices and aspirations. Demographic information will be used to investigate associations between teacher characteristics including ethnicity, education, and experiences and reported career aspirations. In addition, quality ratings will be examined in relation to teachers' career goals. Higher quality centers can have half the turnover as a lower quality setting (Cost Quality and Outcomes Study Team, 1995). For this reason, higher-quality childcare settings have a low staff turnover to offer children a better educational experience (Whitebook, 1999). Results will be discussed in terms of implications for teacher training and retention.

“Biochemical Characterization of the yngF Gene from Bacillus subtilis”

Presenter: Smith, Jeffrey

Mentor: Jason Reddick

Department: Chemistry & Biochemistry

Bacillus subtilis is a model organism used often in life sciences research for its ability to differentiate into spores. While the entire genome of B. subtilis has been sequenced, not much is known about the biochemical pathways that the genes follow. In order to advance the understanding of genomes in all organisms, we are currently studying a biochemical pathway which includes one of these genes, yngF, which is used during the sporulation process of B. subtilis. Our hypothesis is that yngF acts as an enoyl-CoA hydratase, which will convert enoyl-CoA into β -hydroxybutyryl CoA. To accomplish our goal, the yngF gene had to first be isolated. The gene was then placed into a plasmid so that it could be inserted into another bacterium. This bacterium was Escherichia coli, and was chosen due to its ability to overexpress genes in certain conditions. The E. coli containing the plasmid were then induced, which allowed for large quantities of protein to be made. From there, the proteins were then purified using affinity column chromatography. Now that the purified protein has been gathered, we will determine whether yngF is truly an enoyl-CoA hydratase involved in B. subtilis sporulation.

“Enzymatic Inhibition of Cytochrome P4502E1 by Essential Oils”

Presenter: Sollenberger, Jill

Mentor: Greg Raner

Department: Chemistry & Biochemistry

In the past decade, essential oils have quickly gained popularity as alternatives to modern medicine because of their ability to treat a variety of health conditions. Oils such as Cinnamon, Coriander, Citronella, and Lemongrass have aldehyde constituents that make up a significant percentage of the oil. Prior studies have shown that in general, aldehydes have a significant potential to inhibit drug metabolizing enzymes in the liver. One specific enzyme is Cytochrome P4502E1 which metabolizes environmental toxins like tobacco nitrosamines, as well as common pharmaceutical agents such as Tylenol. In both cases, the metabolism of these substances by 2E1 is responsible for the production of toxic byproducts. Although inhibiting the action of CYP4502E1 by popular aldehyde containing essential oils could compromise an individual's ability to eliminate these foreign substances. Inhibition could also prevent the activation of harmful toxins, thus making the use of essential oils as a remedy beneficial since they block unwanted metabolism. The current study is aimed at evaluating the potency of inhibition that these popular oils and their main constituents have on CYP4502E1 activity. There is a possibility that if a potent inhibitor is found, it may possess valuable therapeutic properties.

“Depression in Latina Women Residing in the United States:A Community Based Participatory Project”

Presenter: Stokes, Natalie

Mentor: Mona Shattell

Department: Nursing

Mental illness affects women disproportionately. In minority women, the risk of mental illness is increased by racism, discrimination, low income and low education levels. Latina women have the highest prevalence of depression of all women. Yet Latinos in the U.S receive fewer mental health services than other groups. The National Institute of Mental Health/NIH, the Department of Health and Human Services and Healthy People 2010 have all identified a need to address this disparity. The need is especially acute given the prediction that Latinos will constitute 24.4% of the U.S. population by 2050. The purpose of this study was to examine the way that depression affects Latina women residing in the United States (US), using a community-based participatory research (CBPR) approach. The study used a qualitative method implemented through a CBPR approach. Data were collected by community researchers in three Spanish-language focus groups with adult Latina women. Data were analyzed by the CBPR team using qualitative description. Latina women discussed their perceptions of the meaning of mental health and mental illness, the reasons or causes of depression, the ways in which depression is expressed; and experiences with seeking help for depression; and culturally appropriate ways of addressing depression within the Latino community. Implications of the findings will be presented. Advantages of a CBPR approach will be discussed.

“Development of a Purification Protocol for an Inhibitory Anti- ATF1/CREB Single Chain Antibody Fragment (scFv41.4)”

Presenter: Stroud de Ramirez, Shayla

Mentor: Johanna Mazlo

Department: Chemistry & Biochemistry

Antibody variable domains represent potential structural models for the rational design of therapeutic molecules that bind cellular proteins with high affinity and specificity. The Activating Transcription Factor 1(ATF1)/Cyclic AMP Response Element Binding Protein (CREB) family of transcription factors are particularly relevant targets due to their strong association with melanoma and clear cell sarcoma. This family of transcription factors has been determined to bind to a known region of DNA. A single-chain antibody fragment (scFv), scFv41.4, has been shown to disrupt the binding of ATF1/CREB to DNA in vitro. ScFv41.4 is a unique antibody fragment because the typical light chain needed to help form the binding pocket is not present. However, functional studies have verified that deletion of the light chain did not result in reduced activity. Further investigation of the structure and binding interactions of scFv41.4 require that it be purified. Hence, a purification protocol must be developed. The scFv41.4 was expressed in Escherichia coli and underwent affinity chromatography.

“Parental Acculturation and Child Adjustment”

Presenter: Tan, Evangeline Grace

Mentor: Wesley Allan

Department: Psychology

This project studies the challenges of immigrant families in Greensboro, North Carolina. We will be focusing on family acculturation and ethnic identity as they relate to anxiety and mood symptoms as well as behavioral problems experienced by a child immigrant in their new homes. We are specifically interested in studying parents' acculturation as well as their beliefs and attitudes about their children's acculturation and ethnic identity to examine how these are related to parent reports of the children's anxiety, mood, and behavior. Our goal of this study is to better understand the experiences of these families, which in turn will hopefully lead to recommendations regarding how these families can adjust more smoothly.

ABSTRACT

“The contribution of Theory of Mind to affective priming with dynamic displays of facial expressions in adults of normal intelligence with autistic traits.”

Presenter: Tan, Evangeline Grace

Mentor: Edward Wisniewski

Department: Psychology

The current experiments were designed to create a situation in which an agent's physical facial features and state of mind are in discrepancy. The aim was to disentangle two explanatory mechanisms for affective priming effects: (1) the positive valence of e.g. a happy face (prime stimulus) is due to the observer's attribution of a positive mental state, or (2) to the positive connotation associated with the physical characteristics of a happy face. Dynamic displays of facial expressions with words superimposed on the last frame were presented. Participants had to evaluate the (positive or negative) valence of the words. The displays either showed an emotional expression (happy or angry) going to neutral, or a neutral expression going to an emotional expression (happy or angry). The first mechanism involves the automatic recruitment of the Theory-of-Mind (ToM) (Baron-Cohen, 1995), but the second does not. Crucially, facilitation of the positive words in the angry-to-neutral condition, and of negative words in the happy-to-neutral condition, was observed. These results support the Theory-of-Mind (ToM) explanation: as an agent's facial expression changes from e.g. angry to neutral, their state of mind is interpreted as becoming more positive, although the stimulus itself contains no positive features. Preliminary data further suggests that people with a high overall score on the Autism-Spectrum Quotient (AQ), Systemizing Quotient-Revised (SQ-R) and Empathizing Quotient (EQ) - which are measures of autistic traits in adults of normal intelligence - showed less ToM effect than those with a low overall score.

“Enzymatic inhibition of Aldehyde Oxidase using straight chain alcohols”

Presenter: Todaro, Mamie

Mentor: Bruce Banks

Department: Chemistry & Biochemistry

Aldehyde Oxidase was partially purified from frozen rabbit liver. After partial purification, a Lowry Protein assay was completed to determine final protein concentration using the properties of Beer's Law. This protein concentration was used to determine the amount of enzyme used in subsequent experiments. In order to determine the inhibitory properties of certain chain alcohols an assay was performed using Phenazine Methosulfate as a substrate. The alcohols used were Methanol, Ethanol, Sec-Butyl, Cyclohexanol, Heptyl Alcohol and Octanol. In this assay, 0.1ml of alcohol replaced 0.1ml of distilled water in the sample cuvette. Controls were run with each assay performed and compared to the sample assays to determine inhibitory properties. It was found that certain alcohols did exhibit inhibitory properties while others had no effect.

ABSTRACT

“Cloning of the *Drosophila* CG16792 gene using a plasmid rescue technique”

Presenter: Ugochukwu, Zimuzor

Mentor: Dennis LaJeunesse

Department: Biology

We are interested in understanding the cellular basis of digestion using the *Drosophila* model system. We have identified a novel region in the anterior midgut of *Drosophila* that we call the Superior Cupric Autonomic Nervous System. The SCANS region is a cluster of 7-9 neuron-like cells called lettuce head cells. The SCANS region is located at the juncture of the innervated anterior midgut and the copper cell/acid secreting region of the larval. This region has a narrower luminal diameter and functions as a valve regulating flow of food. We have identified several genes that are expressed in these lettuce head cells using the UAS/Gal4 expression system. One of these genes is represented by the C805Gal4 enhancer trap. We have cloned the flanking DNA adjacent to C805 enhancer trap using plasmid rescue strategy. We have found that in this enhancer trap line inserts into the CG16972 gene, which encodes a novel protein of unknown function. We believe that a careful genetic analysis of CG16972 will allow us to understand how the SCANS region functions and the role that lettuce head cells play in SCANS function.

“The Service-Learning Journey: Exploring Student Voices, Civic Literacy, and Community Engagement”

Presenter: Valenta, Chris

Co-Author: Spoma Jovanovic

Mentor: Spoma Jovanovic

Department: Communication Studies

The focus of this study was to research and record how students experience their voices in matters of public and civic engagement. The study examined university students' responses after participation in a service-learning course. The study also considered the views of students from a local high school with whom UNCG students were working with, for their service-learning project. More specifically, we explored the following research question: RQ: What are the ways in which students identify that their “voices” are heard in the community? To more fully consider how the service-learning experience leads to the development of voice, and importantly, action, we also examined the following issues within our overarching question: What do students identify as the reason(s) it is important to speak out in the community? What are the public issues students identify as important to discuss with others? What forms of acknowledgement for speaking in public are important to students? What impact does participation in a service-learning class have on the development of students' voices? This research program responds to the call by national leaders in the service-learning field to collect qualitative data that offers insight into how service-learning impacts student learning and citizenship outcomes (Battistoni, 2006). Upon completion of this first phase of research, we will inquire into the possibility of following the Dudley High School freshman class through graduation in 2011 to determine if our service-learning programs for civic engagement positively impact graduation rates and achievement scores.

“Documenting Arts Entrepreneurship”

Presenter: Walentuk, Ethanie

Mentor: John Lee Jellicorse

Department: Broadcasting & Cinema

Ethanie Walentuk was one of three outstanding Broadcasting and Cinema writing students chosen to help initiate a new campus initiative, Entrepreneurial Innovation in the Arts (EIA). This program is a part of the larger program, Building Entrepreneurial Learning for Live (BELL), the purpose of which is to expand the concept of entrepreneurship, broadly defined as “the process of starting new enterprises that are sustainable and create value,” across the UNCG Campus. After instruction in the BELL and EIA missions and review of appropriate interviewing techniques, Ethanie's role was to identify and interview local arts entrepreneurs and prepare stories to be posted (and archived) on the EIA web site <<http://eia.uncg.edu>>. Currently four of the main stories on the site were produced by Ethanie: the stories Arts Entrepreneurs BELL Forum, Jane South, Wanda Urbanska, and Tracey Marshall.

“Floral Reflectance Plasticity in Various Species of Plantago”

Presenter: Willis, Andrew

Mentor: Elizabeth Lacey

Department: Biology

Plantago is a genus of weedy plants found throughout the world in a variety of habitats. It is divided into six subgenera: Plantago, Bougeria, Albicans, Psyllium, Litorella, and Coronopus. The species *Plantago lanceolata* has been shown to exhibit phenotypic plasticity in floral reflectance. Cooler temperatures produce darker flowers, while warmer temperatures produce lighter flowers. We are measuring floral reflectance in various *Plantago* species within four of the six subgenera. The species being investigated are: *P. tomentosa*, *P. afra*, *P. coronopus*, *P. albicans*, *P. maritime*, *P. lanceolata*, *P. weldenii*, *P. major*, *P. lagopus*, and *P. subulata*. From our results we hope to make inferences about the evolutionary history of floral reflectance plasticity in the *Plantago* genus.

“Carteret County Shrimp Fishermen: Responding to Economic Change”

Presenter: Wood, Patrick

Mentor: Susan Andreatta

Department: Anthropology

Carteret County shrimp fishermen share a long maritime history in Coastal North Carolina. Shrimp fishing has offered opportunities for those who live near the water to make a living from the sea. Over the last twenty years economic data demonstrates regular fluctuations in annual shrimp prices and pounds of shrimp landed. In 2002 the market entered into a declining trend. Many attribute the low prices to increases in shrimp farm production in the developing world. High fuel prices, closing fish houses and competition for waterfront access from developers in Carteret County are compounding problems for the fishermen. Since 2002 two thirds of the commercial fishermen in Carteret County have quit. Some of those who remain are exploring new markets and strategies to remain fishing. Political Economy sheds light on the challenges faced in an increasingly globalized economy. Ethnographic research was conducted during 2007 offering a first hand account of commercial fishing down east in Carteret County.

“The *Drosophila* longitudinal muscle expressing Gal4 line 5053A is an insert into the *teyrha-meyrha* gene.”

Presenter: Xiong, Mai

Mentor: Dennis LaJeunesse

Department: Biology

The *Drosophila* larval midgut is composed of an endothelial tube surrounded by two sets of visceral muscles: set of circular muscles, which wrap the circumference of the tube and a set of longitudinal muscles, which traverse the length of the tube. Both sets of visceral muscle are required for efficient peristaltic movement of food through the midgut. We are interested in understanding the molecular and cellular mechanisms that govern digestion and the movement of food in the *Drosophila* larval midgut. To identify the genes that are expressed in the larval midgut as well as determine the cellular expression of these genes, we characterized 20 Gal4 lines that have been reported to express in this tissue. One of these Gal4 lines 5053A expresses exclusively in the longitudinal muscles of the midgut. Using a plasmid rescue strategy we have cloned 5053A Gal4 and found it is an insert into a gene called *teyrha-meyrah* (CG8780) located at 76C1 on the third chromosome. *teyrha-meyrah* encodes a novel protein. We are interested in understanding the requirement of this gene in the development and function of the *Drosophila* larval midgut.

“Correlation Study Between Ultraviolet Absorption and MALDI-TOF Mass Spectroscopic Measurements of DNA”

Presenter: Yang, Wan Yu

Mentor: Norman Chiu

Department: Chemistry & Biochemistry

One of the latest initiatives from the National Institutes of Health is The Cancer Genome Atlas (TCGA) which aims to enhance our understanding on the molecular basis of cancer through the application of genomic analysis. Similar to the Human Genome Project, any future advances of TCGA will rely on the use of large-scale genome sequencing methods. Among the current sequencing methods, oligonucleotide is the most commonly used chemical reagent. The conventional method for determining the amount of an oligonucleotide is ultraviolet (UV) absorption at 260nm. This method, however, is unable to characterize the molecular size and DNA sequence of an oligonucleotide. The goal of this project is to study the correlation between the results obtained from UV absorption and matrix-assisted laser desorption/ionization time-of-flight (MALDI-TOF) mass spectrometry for determining the concentration of DNA. In this study, a pure synthetic 20mer oligonucleotide with a known DNA sequence is used as a model.