MONMOUTH UNIVERSITY
SCHOOL OF SCIENCE

TENTH ANNUAL STUDENT RESEARCH CONFERENCE
Friday, April 15, 2011
Wilson Hall

Presentations by Department

Department of Biology

Effects of Ocean Acidification on the Predator Avoidance Behavior of Larval Fish
Nicole Starinksy
Faculty Mentor: Dr. Ursula Howson

Influence of Culture Density of Fibroblasts on the Regulation of Cadherins
Vincent Marchese, Saleen Khan, Mena Gaballah
Faculty Mentor: Dr. Dorothy Lobo

Macrozooplankton of Upper Barnegat Bay
Recial Arribe, Allison Crawford, Josette Hutcheson, Arielle LeBeau, Chelsea Lorentz, Scott Mayes, Nicole Wisniewski, Yunmi Zaccaro
Faculty Mentor: John Tiedemann

Movement Patterns and Site Fidelity of Long-Spined Sea Urchin *Diadema Antillarum* on Bahamian Patch Reefs
Carissa Maurin
Faculty Mentor: Dr. Ursula Howson

Problem Solving Behavior of Giraffe (*Giraffa camelopardalis)*
Kyle Sieverd
Faculty Mentor: Dr. Donald Dorfman

Rat Testicular HIF-1 DNA Binding Activity Confirmed by Electrophoretic Mobility Shift Assay
Christine Dugan, Marie Karpodinis
Faculty Mentor: Dr. Michael Palladino

The Role of Beach Nourishment on the Success of the Invasive Asiatic Sand Sedge
Christopher Torres
Faculty Mentor: Dr. Pedram Daneshgar

Synthesis of a New Molecule and Alteration of Catalase Activity to Explore Inhibition of Level II Resistant Bacteria by Essential Plant Oil Components
Jared Rosenblum
Faculty Mentor: Dr. James Mack

Temperature Dependent Growth Response of Larval Goosefish, *Lophius americanus*
Derrick Alcott
Faculty Mentors: Dr. Ursula Howson, Dr. Richard Bastian

Department of Chemistry, Medical Technology and Physics

Fate of Hexavalent Chromium in the Aqueous Environment
Aracelis Lantigua, Nicole Palermo
Faculty Mentor: Dr. Tsanangurayi Tongesayi

Olefin Matathesis Reactions History and Applications of an Essential Metal-Catalyzed Reaction
Miriam Basiouny, Lauren Bonfiglio, Gillian Shaw, Alyssa Teehan
Faculty Mentor: Dr. Carolyn Supplee

The Study of Chiral Bidentate Phosphine Ligands
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Faculty Mentor: Dr. Carolyn Supplee

Synthesis of Viologens
Mark Stranieri, Allison Geoghan, Samantha Damiano, Rich Paseler
Faculty Mentor: Dr. Massimiliano Lamberto

Department of Computer Science and Software Engineering

Database System for Maintaining Index Engines Tape Information
Brian Brooks, David Gramlich, Andrew Pierce, Justin Poulaille
Faculty Mentor: Dr. Daniela Rosca

Live Board: A Tool to Provide New Experiences of Teaching and Collaboration
Ramon Bautista, Joe Boyd, Eric Fay, Catherine Thomas
Faculty Mentor: Dr. Cui Yu

Department of Mathematics

The Likelihood That Mast Cell Tumors Will Spread to Regional Lymph Nodes in Dogs
Erica De Clemente, Kaitlyn Palmiotto, Nicole Cultrera
Faculty Mentor: Dr. Richard Bastian

Regenerative Stem Cell Therapy in Dogs
Colleen McKendry, Joan Grzankowski
Faculty Mentor: Dr. Richard Bastian

Statistical Analysis of Adolescent Reading in Text and Digital Environments
Maria Ferrara
Faculty Mentor: Dr. Richard Bastian

Effects of Ocean Acidification on the Predator Avoidance Behavior of Larval Fish

Nicole Starinsky

Monmouth University
Department of Biology

Faculty Mentor: Dr. Ursula Howson

Global atmospheric carbon dioxide (CO2) increased above normal levels in the 20th century, and is expected to continue to rise for the foreseeable future. The world's oceans have taken up approximately 50% of the additional CO2 thus far, thereby mitigating effects of global warming to some extent. However, this excess CO2 in the world's oceans is causing acidification due to an inbalance in the CO2-carbonate buffering system, leading to an increase in available H+ ions and a concomitant decrease in pH. Increase of CO2 in seawater drives the CO2-carbonate system to increase the concentration of hydrogen ions in the water, therefore decreasing pH, and decreasing the bioavailability of calcium carbonate (CaCO3). CaCO3 is typically bioavailable in marine systems as aragonite and is utilized by marine organisms (e.g. coccolithophores, mollusks, fishes) for production of biological structures (e.g. tests/coccoliths, shells, otoliths).

Fish otoliths are important in maintaining balance, so any changes in otolith macrostructure may affect fish movement and, ultimately, ability to avoid predation.

This research examined the effects of ocean acidification on biodeposition of CaCO3 in larval fish (Fundulus heteroclitus). Larvae were exposed to different pH (6, 6.5, 7, 7.5, 8) and temperature (22 and 27°C) levels. Behavioral analyses were conducted to examine effects on predator avoidance.

Influence of Culture Density of Fibroblasts on the Regulation of Cadherins

Vincent Marchese, Saleen Khan, Mena Gaballah

Monmouth University
Department of Biology

Faculty Mentor: Dr. Dorothy Lobo

Cadherins are integral proteins that play an important role in cellular adhesion. Multiple types of cadherins have been identified, and their roles in cancer are being investigated. Loss of E-cadherin, which is usually found in epithelial tissue, allows increasing cellular motility and has been associated with cancer progression. E-cadherin has an 80 kDa domain that is located in the extracellular space. It has been confirmed that if E-cadherin is cleaved to release the 80 kDa fragment, it is no longer active. Interestingly, this 80 kDa product has been found to be increased in several types of cancers. In this work, the presence of an 80 kDa protein reactive with E-cadherin antibody, consistent with the inactive cleavage product of E-cadherin, has been detected in normal fibroblasts (BJ cells) and fibrosarcoma cells (HT-1080), and is expressed at a slightly higher level in subconfluent cells than confluent cells. Similarly, matrix metalloproteinase-9 (MMP-9), which is capable of cleaving cadherins, is also expressed more in subconfluent cells. Therefore, obtaining a confluent state is correlated with decreased MMP-9 expression, and loss of the 80 kDa fragment. Previous work has also shown that activation of mitogen-activated protein kinases (MAPKs) decrease upon reaching a contact-inhibited state. The potential role of cadherin signaling on the regulation of MAPK pathways remains to be investigated.

Macrozooplankton of Upper Barnegat Bay

Reciel Arribe, Allison Crawford, Josette Hutcheson, Arielle LeBeau, Chelsea Lorentz, Scott Mayes, Nicole Wisniewski, Yunmi Zaccaro

Monmouth University
Department of Biology

Faculty Mentor: John Tiedemann

As the main herbivorous component of marine ecosystems, zooplankton play an important role in estuarine food webs. Macrozooplankton are particularly important because they are intermediaries in estuarine food chains, forming a link between smaller zooplankton and higher trophic levels, including many commercially and recreationally valuable fishes. However, despite their importance in filling this niche, little is known about the distribution, abundance, and ecology of macrozooplankton in many coastal regions. This is the case in the Barnegat Bay ecosystem where there has not been a detailed survey of zooplankton since the 1970's.

Biological conditions, physical conditions and environmental degradation in estuaries exert control over the composition, abundance, and distribution of zooplankton in estuaries and zooplankters must adapt to varying stresses associated with changing conditions. The environment of Barnegat Bay has changed considerably over the 3 decades since the last comprehensive zooplankton studies were conducted. The bay has been affected by an array of human impacts that potentially threaten its ecological integrity, including nutrient enrichment, algal blooms, alterations of freshwater inputs, and extensive development around the bay and its watershed.

Initiated in March 2010, the objective of this project is to gather information on the current status of macrozooplankton populations in upper Barnegat Bay and to determine if the species composition of important macrozooplankters has changed over the past several decades. The results of this project will include production of the first inventory of common macrozooplankton compiled for the Barnegat Bay ecosystem in over 30 years. In addition to providing updated information on the status of this important component of the bay's living resources, the results of this study will yield updated information on the seasonal occurrence and peak abundance periods for nuisance zooplankton species in the bay, including ctenophores and sea nettles.

Movement Patterns and Site Fidelity of Long-Spined Sea Urchin *Diadema antillarum* on Bahamian Patch Reefs

Carissa Maurin

Monmouth University
Department of Biology

Faculty Mentor: Dr. Ursula Howson

Long spine sea urchin Diadema antillarum is native to the coral reefs of the western Atlantic and Caribbean basin. D. antillarum suffered a mass mortality in 1983 throughout the entire Caribbean, which caused a 95 – 99% decline in D. antillarum population densities. This dramatic population decrease destroyed coral reefs. Macroalgae is the main food source of D. antillarum, and without their grazing pressure, the algae overtook coral reefs. This research explored techniques to increase the population of D. antillarum across the Caribbean. D. antillarum occasionally occur in high-density, localized populations, but it is unclear whether they will migrate to unexploited habitats. Artificial transplantation may be an effective technique for increasing D. antillarum populations on low-density reefs. Transplantation studies were conducted in Eleuthera, The Bahamas to determine the efficacy of the technique in increasing populations of D. antillarum on suitable but unexploited reefs. Quadrat surveys were conducted on patch reefs to determine baseline densities in order to identify source and transplant sites. Abiotic parameters and presence of predators were noted for each site. D. antillarum were collected from high-density patch reefs, marked with marine paint, and transplanted to low-density patch reefs and artificial reef balls. Daily (for 2 wks post-transplantation) and annual surveys were conducted to evaluate the retention and survival of transplanted D. antillarum at each of four sites. Preliminary results indicate that turbidity, current strength, and predation are the main factors that decrease the survival of D. antillarum.

Problem Solving Behavior of Giraffe (*Giraffa camelopardalis*)

Kyle Seiverd

Monmouth University
Department of Biology

Faculty Mentor: Dr. Don Dorfman

A herd of eight non-dispersed giraffe were observed three days a week from 11am till 4pm from Mid-July until the 1st week of August at Six Flags: Wild Safari, NJ. Behavior was monitored and recorded using photography and written description. Giraffe were observed from an observation station within the African Plains enclosure and interaction between the giraffe and observer was limited. Individual giraffe behavior was timed from start to finish of specific activity and percentage of daily time expenditure was formulated for each activity. Percentage time spent car licking and feeding varied the greatest depending on the individual giraffe's habituation to the presence of humans. More habituated giraffes showed a higher percentage of time feeding and car licking. Of interest was giraffe behavior while feeding on vegetation from various species of foliage within the enclosure. Methods of obtaining leaves out of tongues' grasp varied. Using the tongue to pull down branches with leaves out of reach was the main method observed. The various methods used to problem solve showed intelligence and a source of mental stimulation for the giraffe. Lack of mental stimulation has been linked to the emergence of stereotypic behaviors. Allowing giraffe to feed from foliage, which many enclosures lack, provided mental stimulation via problem-solving.

Rat Testicular HIF-1 DNA Binding Activity Confirmed by Electrophoretic Mobility Shift Assay

Christine Dugan, Marie Karpodinis

Monmouth University
Department of Biology

Faculty Mentor: Dr. Michael A. Palladino

Spermatic cord torsion can result in ischemia, hypoxia-induced germ cell apoptosis, and impaired fertility. Activation and inhibition of oxygen-dependent genes and proteins contribute to the degree of cellular damage in the ischemic testis. We hypothesize that the oxygen-sensitive protein, hypoxia inducible factor-1 (HIF-1) protects Leydig cells from ischemic injury. HIF-1 is a transcription factor which activates gene expression in response to hypoxia. Previously we determined that testicular HIF-1 is abundant in Leydig cells, levels of HIF-1 mRNA and protein are unregulated by ischemia, and that myeloid leukemia cell-1 (Mcl-1) is a candidate target gene for testicular HIF-1 with a potential role in antiapoptotic protection of Leydig cells. Unlike most tissues, testicular HIF-1 protein is abundant in the normoxic and ischemic testis; however, it is unclear if rat testicular HIF-1 is active in the normoxic and ischemic testis. The goal of this project was to determine if HIF-1 in the normoxic or ischemic testis is an active transcription factor by using an Electrophoretic Mobility Shift Assay (EMSA) to evaluate HIF-1 DNA-binding activity. Unilateral testicular torsion (720 degrees) in adult Sprague-Dawley rats was surgically induced for one hour of ischemia. Nuclear and cytoplasmic proteins from normoxic and ischemic rat testis were isolated and HIF-1 alpha; detected by Western Blotting. EMSA experiments were carried out by incubating nuclear and cytoplasmic protein extracts with a biotin-labeled oligonucleotide containing a consensus Hypoxia Response Element (HRE) binding site. Unlabeled actin oligonucleotide was used as a control. Oligo-protein complexes were separated by non-denaturing polyacrylamide gel electrophoresis, and shifts detected by enhanced chemiluminescence. Supershift experiments and competition assays with unlabeled oligonucleotides were carried out to determine the specificity of HIF-1 binding. EMSA revealed DNA binding activity of testicular HIF-1 isolated from normoxic and ischemic testes. There was no observed difference in DNA binding activity in normoxic and ischemic protein extracts as demonstrated by EMSA. Competition experiment with unlabeled oligonucleotide revealed a diminished shift signal. In conclusion, results of EMSA experiments and previous work demonstrate HIF-1 DNA binding activity in both the normoxic and ischemic testis indicating potentially novel regulatory pathways for testicular HIF-1.

The Role of Beach Nourishment on the Success of the Invasive Asiatic Sand Sedge

Christopher Torres

Monmouth University
Department of Biology

Faculty Mentor: Dr. Pedram Daneshgar

Asiatic sand sedge (Carex kobomugi) is a non-indigenous species currently affecting vegetated dunes across the Atlantic coast. Asiatic sand sedge is very competitive and can easily conquest any dunes controlled by American Beach Grass. Dunes overtaken by Asiatic sand sedge are affected in two different ways; it can limit the survival of any other plant organism in the dune and it causes the dune to become more vulnerable to strong winds and storms. Beach nourishment (burial) has been suggested to exterminate Asiatic sand sedge while promoting the growth of the desired American Beach Grass, but no work, to date, has definitely shown this.

We hypothesize that beach nourishment does not have an effect on the growth rate or overall survival of Asiatic sand sedge. In order to test the hypothesis, three sites at Island State Park in New Jersey were used to test the survival of Asiatic sand sedge and American Beach Grass after beach nourishment. Each site consisted of 5 different sand treatments: 6 inches, 12 inches, 18 inches, 24 inches and a control treatment with no burial. Different sites were selected to increase statistical strength to our treatment differences. We expect that Asiatic sand sedge will survive after each beach nourishment treatment. The deep burial of the organism could cause a stimulation of its rhizomes; thus, causing the rhizomes to extend and produce new shoots on the surface of the buried area.

Synthesis of a New Molecule and Alteration of Catalase Activity to Explore Inhibition of Level II Resistant Bacteria by Essential Plant Oil Components

Jared Rosenblum

Monmouth University
Department of Biology

Faculty Mentor: Dr. James Mack

Studies of the susceptibility of both anaerobic and aerobic gram-negative and gram-positive level II resistant bacteria to essential plant oil components indicated a mechanism of inhibition. The components represent a correlation to chemical reactivity. Bacteria that gram-stain similarly differed in their mode of respiration. It appears that a change in activity of the enzyme catalase is responsible for aerobic respiration and cell survival regulation. Thus, catalase activity in the presence of the essential oil components was examined. A synthesis to combine the molecular features of both citral and methyl salicylate was targeted.

Essential plant oil components are tested as potential substrates for the enzyme, catalase, using <1% wt Tween 20, 100 mmol of the substrates, and 0.12% hydrogen peroxide, in an indicator assay for the iodide complex that absorbs at 500 nm. These trials are compared to true time zero points without hydrogen peroxide degradation by catalase. Attempts at chemical synthesis are in progress to prepare a new substance via a directed aldol condensation.

Methyl salicylate accelerates catalase activity, as does eugenol to a lesser degree. Citral, geraniol, and isopropyl benzaldehyde do not appear to have a large effect on changing the activity of catalase. The aldol condensation appears to have succeeded in producing a new molecule with the features of both methyl salicylate and citral. According to thin layer chromatography, infrared spectroscopy, and nuclear magnetic resonance, it is most likely E-methyl-(3,7-dimethyl-2,6-octadenoyl)-2-hydroxybenzoate. Catalase is a critical regulator of both the cellular oxidative stress response and intrinsic mechanisms of apoptosis. Acceleration of catalase leads to controlled cell death, consistent with the inhibition and absorbance assay results with the phenols methyl salicylate and eugenol. The newly synthesized molecule may serve as a proof of regulation of bacterial cell death by these mechanisms if successful at inhibiting both bacteria.

Temperature Dependent Growth Response of Larval Goosefish, *Lophius americanus*

Derrick Alcott

Monmouth University
Department of Biology and Department of Mathematics

Faculty Mentors: Dr. Ursula Howson, Dr. Richard Bastian

Goosefish Lophius americanus produce a large buoyant mucogelatinous matrix or `veil' of 0.3 to 2.8 million fertilized eggs per female. The rate of growth of the larvae and the time required until larvae hatch out from the veil is dependent on temperature. Fertilization was observed in captivity allowing for the accurate determination of age of the larvae. Four groups of fertilized eggs were maintained in separate tanks, two groups at 12oC and two at 17oC. Morphometric characteristics including total length, notochord length, dorsal fin length, pelvic fin length, eye diameter, and yolk sack volume of the developing larvae were measured over a period of 24 days.

Statistical analysis of growth rates is being explored comparing the two temperature conditions. Different growth curves are seen for different variables such as an exponential decay of the yolk sack and a linear growth of total length. The goal of this project is to create a model(s) using the given parameters to predict the physiological day at age of larval goosefish (predicting the age of a fish at any temperature), and to determine if there is a significant difference in growth rates depending on the temperature of the environment in which the larvae are developing.

Fate of Hexavalent Chromium in the Aqueous Environment: The Role of Fulvic Acid and Iron

Aracelis Lantigua, Nicole Palermo

Monmouth University
Department of Chemistry, Medical Technology, and Physics

Faculty Mentor: Dr. Tsanangurayi Tongesayi

Trivalent chromium (Cr(III)) and hexavalent chromium(Cr(VI)) represent the two most common inorganic forms of chromium. Both forms have high chronic toxicity to aquatic life. Cr(III) occurs naturally and is an essential trace nutrient to humans and animals whereas Cr(VI), a known carcinogen, enters the environment, mostly, as a result of anthropogenic activities. One of the major sources of exposure of Cr(VI) to humans is drinking water. We are studying the effect of fulvic acid, a model for dissolved organic matter, iron, pH and light on the fate of Cr(VI) in an aqueous environment. Our results show that at pH 8 and 9 in both light and dark FA acid stabilizes Cr(VI) through complex formation and that Fe enhances complex formation between Cr(VI) and FA through intermetallic bridging. At pH 4 and 5, under similar conditions, complex formation occurs but not to the same extent as at pH 8 and 9, and the presence of Fe results in the reduction of Cr(VI) to Cr(III). Reduction of Cr(VI) to Cr(III) occurred even in the absence of FA, showing that FA may not part of the reduction reaction. The Cr(III) produced was in the form of chromite, $FeCr_2O_4$, a brown precipitate. Cr(VI) was reduced to below detection limits of UV-Vis spectrophotometry. The reduction of Cr(VI) to chromite may be a cheaper but effective method of removing the carcinogenic hexavalent chromium from drinking water.

Olefin Metathesis Reactions History and Applications of an Essential Metal-Catalyzed Reaction

Miriam Basiouny, Lauren Bonfiglio, Gillian Shaw, Alyssa Teehan

Monmouth University
Department of Chemistry, Medical Technology, and Physics

Faculty Mentor: Dr. Carolyn Supplee

Olefin metathesis provides an efficient method for the creating new olefinic compounds. Olfenic compounds containing carbon- carbon double bonds are valuable starting materials and products in the pharmaceutical industry. And, recently even insect pheromones and prostaglandins have been synthesized via metathesis reaction chemistry. One of the earliest metathesis catalyst was developed by Robert Grubs and others and was based on ruthenium phosphine chemistry. In the last sixty years, significant progress had been made in catalyst development by varying the nature of the phopshine ligand bound the metal as well as the metal itself. The design of the metal catalyst has lead to advancements in the applications of metathesis chemistry including the creation racemic mixtures of chiral compounds. Four of the major classes of metathesis reactions that will be discussed herein include cross-metathesis, ring-opening metathesis polymerization, ring-closing metathesis, and acyclic diene metathesis polymerization.

The Study of Chiral Bidentate Phosphine Ligands

Mike Bertocchi, Dylan Bradley, Susette Ingram, Christina Roselli

Monmouth University
Department of Chemistry, Medical Technology and Physics

Faculty Mentor: Dr. Carolyn Supplee

The design and synthesis of new chiral phosphine ligands is a vital research subject in the field of transition-metal catalysis. The use of chiral phosphine ligands with suitable transition metals has demonstrated the synthesis of enatniomerically pure organic compounds, which are needed in the flavor, fragrance, materials, medicinal and pharmaceutical industries. Using chiral catalysts should enable the large-scale production of these enatniomerically pure compounds from petroleum and non- petroleum based feedstock. The design and nature of the phopshine ligand determines the behavior and selectivity of the resulting ligand-metal complex/catalyst. This scope of our research focuses on designing new and novel bidentate chelating phosphine ligands. Specifically, we are interested in designing phosphine ligands that incorporate either an aryl or cycloalkyl group in the carbon backbone of these chelating ligands and investigating their steric and electronic effects that they impart on the metal catalyst.

Synthesis of Viologens

Mark Stranieri, Allison Geoghan, Samantha Damiano, Rich Paseler

Monmouth University
Department of Chemistry, Medical Technology and Physics

Faculty Mentor: Dr. Massimiliano Lamberto

The objective of this work was to expand on previously established methodology that investigated the effects of microwave technology in the synthesis of symmetric viologens. Several symmetric viologens were successfully synthesized by microwave irradiation in less than 5 minutes and in excellent yields. The synthesized compounds were then characterized by 1H, 13C, COSY, and DEPT NMR spectroscopy. The synthetic investigation included varying solvent effects, reaction conditions, and concentration effects. These results will be presented along with proposals about future work.

Database System for Maintaining Index Engines Tape Information

Brian Brooks, David Gramlich, Andrew Pierce, Justin Poulaille

Monmouth University
Department of Computer Science and Software Engineering

Faculty Mentor: Dr. Daniela Rosca

The goal of this project was to create a maintainable database system to automate the search of computer hardware tapes used by employees of Index Engines in the completion of their testing procedures. We students were responsible for creating a database of hundreds of tapes, containing over ten different key types of information about tapes (tape name, tape type, tape format, tape location, etc.) in SQL, and created a front end User Interface to allow easy interaction between the user and the database.

The project is nearly completed and operational, and allows for searches of any tape stored in the database, and allows users to filter results based on specific criteria, allows users to add, delete, or modify tape information, and allows users to create comments on tapes, which can be viewed by all users. We will soon start the testing phase of our project, and plan on having a working demonstration of the system accessible on our laptops within the next few weeks.

LiveBoard
A Tool to Provide New Experiences of Teaching and Collaboration

Ramon Bautista, Joe Boyd, Eric Fay, Catherine Thomas

Monmouth University
Department of Computer Science and Software Engineering

Faculty Mentor: Dr. Cui Yu

LiveBoard is an interactive computing application that enables multiple users to communicate on one central medium in real time. It provides the closeness, convenience and effectiveness that people could have when meeting in a classroom, conference room, or anywhere people can sit down with pen and paper.

LiveBoard has a minimalistic full-screen drawing board on each user's screen, which is updated in real time, allowing each user to participate in a live manner. Our design goal is to make it easy to use, avoiding user confusion and screen clutter. It provides many features like highlighting part of the board, text messaging, and taking snapshots. More graphic functions and voice features will be integrated in later stages of implementation.

The Likelihood That Mast Cell Tumors Will Spread to Regional Lymph Nodes in Dogs

Erica De Clemente, Kaitlyn Palmiotto, and Nicole Cultrera

Monmouth University
Department of Mathematics

Faculty Mentor: Dr. Richard Bastian

The project is being done in collaboration with a surgical resident at Red Bank Veterinary Hospital. The main goal of the study is to find the probability that a grade 2 mast cell tumor in a dog will spread to a regional lymph node and the mean survival time of that dog. Grade 2 mast cells are the common in dogs and there have not been any papers on the spread of grade 2 mast cells tumors to the lymph nodes yet. The current objectives of this project are to construct a final data set and begin running the initial tests. Areas being looked at for this project are the incidence of tumors, predisposition, 2nd surgery, treatment in terms of survival, and why the lymph node was enlarged. The variables include breed, sex, age at diagnosis, weight, location of primary tumor, and clinical proliferation indices. The benefit of this project is to help make better treatment decisions for dog owners.

Regenerative Stem Cell Therapy in Dogs

Colleen McKendry and Joan Grzankowski

Monmouth University
Department of Mathematics

Faculty Mentor: Dr. Richard Bastian

In conjunction with a veterinarian, we analyzed the method of regenerative stem cell therapy in dogs. Stem cell therapy is the process of removing stem cells from a fatty tissue sample taken from a dog and injecting the stem cells in an arthritic joint. Our purpose was to determine which variables are important in extracting the highest yield per gram of stem cells. These variables included gender, breed, location of the removed tissue, body condition, neutered status, and age. The statistical analysis involved performing non-parametric testing on a dataset of 1368 dogs. Non-parametric tests compare the median viable cells per gram across the medians of the various independent variables.

Upon performing these tests we found statistically significant differences within the location category. There was also a difference across the neutered status variable.

Statistical Analysis of Adolescent Reading in Text and Digital Environments

Maria Ferrara

Monmouth University
Department of Mathematics

Faculty Mentor: Dr. Richard Bastian

This project is a preliminary data analysis of a pilot study given to high achieving 10th grade students in Biotechnology High School in Freehold, New Jersey. The pilot was run to compare adolescent literacy achievement in a digital environment and a text environment. The 57 students that participated were given both text and digital tests; the students were given 30 minutes to take each type if test. Both types of tests consisted of 6 multiple choice questions, an extended response, and a short answer question. A supplementary questionnaire was given to all participants that involved questions of gender, reading preference, leisure time spent reading, and time spent on communications technology. Initial techniques used to compare means of the two scores, with the addition of the subcategories, involve T-tests and ANOVA. There were no significant differences in mean test scores of both test medias when accounting for the students' reading preferences, leisure time spent reading, and time spent on communication. A significant difference was found in the mean test scores with gender. Females scored statistically higher than males on both types of tests.

Student Research Conference Presenters 2001-2010

2001	*Department*
Daniel Broy	**Biology**
Robert Clauburg	**Mathematics**
Joshua Davidow	**Mathematics**
Sindia Dosdian	**Chemistry, Medical Technology and Physics**
Rashawnah French	**Mathematics**
Susan Koreen	**Biology**
Jennifer Lee	**Mathematics**
Trinh Anh Luu	**Chemistry, Medical Technology and Physics**
Tricia A. Mallonga	**Biology**
Lisa Ricciardelli	**Mathematics**

2002	*Department*
Kanesha Bacon	**Biology**
Joseph Baldini	**Software Engineering/Information Technology**
Stephanie Beatty	**Mathematics**
Melissa Berfield	**Mathematics**
Katie Blackburn	**Mathematics**
Christopher Bradrick	**Software Engineering/Information Technology**
Kenneth Briley	**Chemistry, Medical Technology and Physics**
Brooke Catalano	**Mathematics**
Christina Colanero	**Mathematics**
Angela Costello	**Software Engineering/Information Technology**
Michael D'Andrea	**Software Engineering/Information Technology**
Elda Dezinord	**Chemistry, Medical Technology and Physics**
Amanda Glynn	**Mathematics**
Nicole Grimes	**Biology**
Meghan Henning	**Mathematics**
Lindsay Keintz	**Chemistry, Medical Technology and Physics**
Stephanie McQuay	**Software Engineering/Information Technology**
Kelly Moore	**Mathematics**
Kellie Nurko	**Software Engineering/Information Technology**
Shanna Palumbo	**Biology**
Lawrence Perruzza	**Biology**
Patrick Pitoscia	**Mathematics**
Kristin Ragucci	**Biology**
Felicita Ramos	**Mathematics**
Linette Santiago	**Chemistry, Medical Technology and Physics**
Christopher Toranto	**Software Engineering/Information Technology**
Iwona Walejnis	**Chemistry, Medical Technology and Physics**
Eric Wasnesky	**Chemistry, Medical Technology and Physics**
Lashonda Williams	**Biology**

Student Research Conference Presenters 2001-2010

2003	*Department*
Christopher Allen	**Software Engineering**
Ross Bayer	**Software Engineering**
Wei Cao	**Computer Science**
Jessica Chapman	**Biology**
Nagarajan Chidambaram	**Computer Science**
Joseph Cusick	**Chemistry, Medical Technology and Physics**
Michael DiGiovanni	**Software Engineering**
Shawn Elliot	**Software Engineering**
Jessica Gregory	**Mathematics**
Julie In	**Biology**
Lindsay Keintz	**Chemistry, Medical Technology and Physics**
Lauren Landrigan	**Software Engineering**
Matthew Littlehale	**Software Engineering**
Shauna LoBello	**Mathematics**
Lina Pachgade	**Computer Science**
Dum Piawa	**Chemistry, Medical Technology and Physics**
Ryan Scally	**Biology**
Dumitru Starciuc	**Computer Science**
Jonathan Thompson	**Mathematics**
Joshua Wayne	**Biology**
Bryan Young	**Software Engineering**
Paul Zoccali	**Mathematics**

2004	*Department*
Michael Barnathan	**Computer Science**
Dana Baruch	**Mathematics**
Sean Bhattacharya	**Biology**
Samantha Bourque-Trieff	**Mathematics**
Jessica Chapman	**Biology**
Joseph Cusick	**Biology**
Melissa Dreher	**Mathematics**
Michael Edwards	**Computer Science**
Christopher Freet	**Software Engineering**
Ketleine Georges	**Biology**
Lauren Grobelny	**Mathematics**
Rajesh Gupta	**Biology**
Dawn Gurigan	**Biology**
Kimberly Jakubowski	**Mathematics**
Theresa Johnson	**Biology**
Mary Juffey	**Mathematics**
Steve Leclair	**Software Engineering**
Holguer Lozano	**Mathematics**

Student Research Conference Presenters 2001-2010

2004	*Department*
Kristy Mann	**Mathematics**
Lisa Marchalonis	**Mathematics**
Robert Monto	**Software Engineering**
Jamie Nolan	**Biology**
David O'Gurek	**Biology**
William Plantz	**Mathematics**
Ahmed Rizvi	**Biology**
Catherine Russamano	**Mathematics**
Ryan Scally	**Biology**
Tamanna Shams	**Biology**
Thomas Siciliano	**Mathematics**
Jennifer Sielski	**Biology**
Jessica Sikka	**Biology**
Brianna Steins	**Biology**
Michael Stoute	**Software Engineering**
Ashley Toth	**Biology**
Jennifer Valentino	**Mathematics**
Kristin Vazzana	**Biology**
Matthew Vidovich	**Software Engineering**
Joshua Wayne	**Biology**
Monh Wehman	**Biology**

2005	*Department*
Johnessa Antonelli	**Mathematics**
Christine Arsego	**Mathematics**
Jill Banholzer	**Mathematics**
Michael Barbato	**Mathematics**
Michael Barnathan	**Computer Science**
Emily Barr	**Mathematics**
Samantha Bourque-Trieff	**Mathematics**
Joe Bucher	**Mathematics**
Debra Cagliostro	**Mathematics**
Nicole Camasta	**Mathematics**
Jessica Chapman	**Biology**
Lauren Chapman	**Mathematics**
Leslie Cordasco	**Mathematics**
Christine DeAngelo	**Mathematics**
Danielle DePasquale	**Mathematics**
Julia Echaluce	**Chemistry, Medical Technology and Physics**
Hala Elachkar	**Mathematics**
Zaneb Eldreny	**Chemistry, Medical Technology and Physics**

Student Research Conference Presenters 2001-2010

2005	*Department*
Angela Freeland	**Mathematics**
Ketleine Georges	**Biology**
Rajesh Gupta	**Biology**
Theresa Johnson	**Biology**
Christina Kelly	**Mathematics**
Bryan Kilmer	**Mathematics**
Joseph McLaughlin	**Biology**
Janine McMillin	**Mathematics**
Meghan Moratelli	**Mathematics**
Audrey Nelson	**Mathematics**
Ryan Pavlosky	**Mathematics**
Ana Pereira	**Biology**
Preethi Pirlamarla	**Biology**
Joseph Reagor	**Mathematics**
Ahmed Rizvi	**Biology**
Sarah Rubin	**Mathematics**
Ryan Scally	**Biology**
Jennifer Sielski	**Biology**
Jenny Sloan	**Mathematics**
TG Smolark	**Mathematics**
Karen Szabunia	**Mathematics**
Joshua Wayne	**Biology**
Eric Yang	**Biology**
Nicole Zuchlinski	**Biology**

2006	*Department*
Johnnessa Antonelli	**Mathematics**
Christine Arsego	**Mathematics**
Jill Banholzer	**Mathematics**
Michael Barbato	**Mathematics**
Michael Barnathan	**Computer Science**
Emily Barr	**Mathematics**
Samantha Bourque-Trieff	**Mathematics**
Joe Bucher	**Mathematics**
Debra Cagliostro	**Mathematics**
Nicole Camasta	**Mathematics**
Jessica Chapman	**Biology**
Lauren Chapman	**Mathematics**
Leslie Cordasco	**Mathematics**
Christine DeAngelo	**Mathematics**
Danielle DePasquale	**Mathematics**
Julia Echaluce	**Chemistry, Medical Technology and Physics**
Hala Elachkar	**Mathematics**
Zaneb Eldreny	**Chemistry, Medical Technology and Physics**
Angela Freeland	**Mathematics**

Student Research Conference Presenters 2001-2010

2006	*Department*
Ketleine Georges	**Biology**
Rajesh Gupta	**Biology**
Theresa Johnson	**Biology**
Christina Kelly	**Mathematics**
Bryan Kilmer	**Mathematics**
Joseph McLaughlin	**Biology**
Janine McMillin	**Mathematics**
Meghan Moratelli	**Mathematics**
Samantha Nealer	**Biology**
Audrey Nelson	**Mathematics**
Ryan Pavlosky	**Mathematics**
Ana Pereira	**Biology**
Preethi Pirlamarla	**Biology**
Joseph Reagor	**Mathematics**
Ahmed Rizvi	**Biology**
Sarah Rubin	**Mathematics**
Ryan Scally	**Biology**
Jennifer Sielski	**Biology**
Jenny Sloan	**Mathematics**
TG Smolark	**Mathematics**
Karen Szabunia	**Mathematics**
Eric Yang	**Biology**
Nicole Zuchlinski	**Biology**

2007	*Department*
Jessica Chapman	**Biology**
Paul Colucci	**Software Engineering**
Mary-Katherine Dughi	**Biology**
Kathleen Field	**Chemistry, Medical Technology and Physics**
Krystle Hinds	**Chemistry, Medical Technology and Physics**
Brett London	**Biology**
Jonathan McNamara	**Biology**
Meghan Moratelli	**Chemistry, Medical Technology and Physics**
Emily Rothenberger	**Biology**
Michael Savarese	**Biology**
Anitha Shankar	**Computer Science**
Meghan Shaw	**Biology**
Michael Slisz	**Biology**
Timothy Swartz	**Biology**

Student Research Conference Presenters 2001-2010

2008	*Department*
John Brown	**Chemistry, Medical Technology and Physics**
Brianna Burdi	**Mathematics**
Eric Byam	**Chemistry, Medical Technology and Physics**
Samantha Cole	**Biology**
Justyne Decker	**Chemistry, Medical Technology and Physics**
Marian Gaballah	**Biology**
Jaclyn Horvath	**Biology**
Alexander Karpodinis	**Computer Science**
Sarah Keyspar	**Chemistry, Medical Technology and Physics**
Mourin Khaleel	**Biology**
Julian Montefusco	**Computer Science**
Jarod Pappalardo	**Mathematics**
Michael Savarese	**Biology**
Anoop Shah	**Biology**
Meghan Shaw	**Biology**
Alina Ventriglia	**Biology**

2009	*Department*
Ruth Adekunle	**Biology**
Julia Arpino	**Biology**
Mary Grace Baker	**Biology**
Larry Brewer	**Software Engineering**
Anthony Dimaria	**Software Engineering**
Kristina Dineko	**Chemistry, Medical Technology and Physics**
Marian Gaballah	**Biology**
Andrea Grafton	**Chemistry, Medical Technology and Physics**
Erin Humphries	**Mathematics**
Alexander Karpodinis	**Computer Science**
Darci Pitchon	**Biology**
Angelo Scribellito	**Software Engineering**
Walter Seme	**Software Engineering**
Michael Sergio	**Software Engineering**
Anoop Shah	**Biology**
Puja Sharma	**Mathematics**
Meghan Shaw	**Biology**
Michael Slisz	**Biology**
Jillian Stokley	**Biology**
Arthur Sullivan	**Software Engineering**
Heather Tyrell	**Biology**
Rebecca Tyson	**Biology**
Michelle Zook	**Biology**

Student Research Conference Presenters 2001-2010

2010	*Department*
Patricia DaSilva	**Chemistry, Medical Technology and Physics**
Katharine Dilger	**Chemistry, Medical Technology and Physics**
Huy Quang Do	**Computer Science and Software Engineering**
Christine Dugan	**Biology**
Kyle Gavin	**Mathematics**
Justin Hanenberg	**Chemistry Medical Technology and Physics**
Devon Hodge	**Biology**
Tristan Hollingsworth	**Chemistry, Medical Technology and Physics**
Ashley Holstein	**Mathematics**
Marie Karpodinis	**Biology**
Alexander O'Ree	**Computer Science and Software Engineering**
Kaitlyn Poracky	**Mathematics**
Emily Pumphrey	**Mathematics**
Vandana Ratakonda	**Computer Science and Software Engineering**
Charles Reed	**Computer Science and Software Engineering**
William Scott	**Mathematics**
Puja Sharma	**Biology**
Nicole Starinsky	**Biology**