

Feb 7th, 9:00 AM - 11:15 AM

Poster Session

Honors College, Old Dominion University

Follow this and additional works at: <http://digitalcommons.odu.edu/undergradsymposium>

Honors College, Old Dominion University, "Poster Session" (2015). *Undergraduate Research Symposium*. 4.
<http://digitalcommons.odu.edu/undergradsymposium/2015/masterschedule/4>

This Event is brought to you for free and open access by the Student Works at ODU Digital Commons. It has been accepted for inclusion in Undergraduate Research Symposium by an authorized administrator of ODU Digital Commons. For more information, please contact digitalcommons@odu.edu.

Learning Commons Map

9:00-11:15 AM

(Learning Commons: Northwest Atrium)

Poster Session

1) Solid State Morphing Aircraft

By **Joe Altomare, Adam Horn, Thomas Lamb, Nathan LaPuma, Aaron Rosenberg, Austin Stallworth, Michael Osunlalu** (Mentor: Dr. Onur Bilgen)

Mechanical and Aerospace Engineering and Electrical Computer Engineering

The purpose of this project is to design, build and test a solid state ornithopter. A solid state ornithopter is an aircraft propelled by flapping wings with no conventional actuators. The Blue Heron's wing planform was used to model the ornithopter's wings due its high aspect ratio and flight capabilities. Using biomechanics, the natural flight of the Great Blue Heron was determined and applied to the design of the ornithopter. A cantilever beam was used for the model wing. Finite element analysis (FEA) was performed to determine deflection of the wing while subjected to distributed and concentrated loads. The so-called Macro-Fiber Composite actuators were used to generate the flapping motion of the wing. The wing was tested under static and dynamic conditions in a wind tunnel to determine its capabilities of producing lift.

2) Relationship Status, Alcohol Use, and Intimate Partner Violence among Lesbians

By **Bre'yn Kelly, Morgan Prothero, Tyler B. J. Mason** (Mentor: Dr. Robin J. Lewis)

Psychology

Lesbian women are more at risk for alcohol use and intimate partner violence compared to heterosexual women. Among individuals in relationships, being in a more committed relationship is associated with greater psychological health and relationship adjustment. However, historically, lesbians have been barred from relationship recognition such as marriage. The current study examined how relationship status, ranging from being more casual to marriage/civil union, was associated with alcohol use and intimate partner violence among lesbian women in relationships.

3) Evaluation of Cellular Effects Induced by Traumatic Air Blast Shockwaves

By **Brittany Hanbury** (Mentors: Dr. Michael Stacey, Dr. Shu Xiao)

Biochemistry

Sudden shocks which can cause traumatic injuries occur to the human body in varying situations. The objective of our investigation was to develop a system to mimic those conditions and assess the effects at a cellular and genetic level. Our system is designed to release an air blast wave up to 100 psi. We evaluated cell survival, cytoskeletal changes, and mechanosensitive ion channel gene expression on multiple cell types in order to better understand what cells undergo due to traumatic injuries.

4) Acceptability of Peer Violence Among Youth Who Reside with Substance-Abusing Parents

By **Rachel Green** (Mentor: Dr. Michelle Kelley)

Psychology

Parental substance abuse, interparental violence (IPV) and community violence (CV) often have harmful effects on youth. In this study, we examined associations between IPV and exposure to CV as related to children's attitudes about the acceptability of peer aggression and retaliation. Participants were 84 families in which one or both parents met DSM-IV-TR criteria for a drug or alcohol disorder. Linear regression models were used to analyze the data. Father's lifetime IPV against the mother resulted in significantly less acceptability of peer aggression; however, child age and lifetime exposure to CV increased children's beliefs about the acceptability of retaliation against an aggressive peer.

5) Computational Analysis of Cyclic Tri-Peptide Ala-Ala-Lys

By **Brian Collister, Evangelos Katsanos, Amy Key** (Mentor: Dr. Jennifer Poutsma)

Chemistry and Biochemistry

Sequencing proteins is important in determining the structure, and the ultimate the function. Tandem mass spectrometry is one of the leading methods used to sequence polypeptide chains. Polypeptides enter the mass spectrometer in the gas phase, and are fragmented and separated by mass. More recently, small peptide fragments have been shown to rearrange in the pre-fragmentation phase by going through a proposed cyclic intermediate. One example of a small peptide that has observed a cyclic rearrangement is the tri-peptide Ala-Ala-Lys. We will be presenting our computational analysis on the cyclic tri-peptide Ala-Ala-Lys in an attempt to understand the mechanism by which it rearranges. This will allow us to further understand this rearrangement, and to predict where it may happen in other small peptide fragments.

6) Developing a Measure of Psychology Aggression: First Steps

By **John De Los Reyes, Shelia Manning, Shanon Sabo, Arushi Deshpande** (Mentor: Dr. Miguel Padilla)

Psychology

Psychological aggression is considered to be behaviors that do no cause bodily harm. Understanding this type of aggression is pertinent because current research suggests that psychological aggression can lead to physical aggression. Therefore, a sound measure of psychological aggression can be used to identify psychological aggression and help quell future acts of physical aggression. In addition, a sound measure of psychological aggression can be used to advance research where psychological aggression is a variable of interest. However, psychological aggression measures are lacking because of two reasons: unsound psychometric properties (e.g., reliability and validity) and a lack of agreement in the literature as to what behaviors constitutes psychological aggression. The purpose of this study is to establish what behaviors operationally define psychological aggression. To achieve this goal a comprehensive literature review and focus groups were conducted. The focus groups were conducted from various populations to provide information as to what behaviors participants think constitutes psychological aggression. The information from the literature review and focus groups will be coded and content analyzed to determine common themes and patterns. From these common themes and patterns, preliminary items will be written. This serves as an important first step in developing a reliable and valid measurement instrument for psychological aggression that overcomes the deficiencies of current measures.

7) Phage Isolation: Trials and Tribulations of Phage Research

By **Jovan Welch, Elizabeth Smith** (Mentor: Dr. Nazir Barekzi)

Biology

Bacteriophages are viruses that infect and destroy bacteria that can be used as an alternative to antibiotics. Antibiotics are over-used world-wide, facilitating the rise of multi-drug resistant bacteria. Phages target specific species of bacteria and co-evolve with target host. Bacteriophages are ubiquitous and found in diverse environments around the world (including soil and water). If phages are living in random soil samples, then we will isolate a single species and interpret the genetic code, with the hopes of isolating a new species.

8) Discovering the Rosepeake 4 Bacteriophage

By **Jack Griffith IV, Kevin Kanda** (Mentor: Dr. Nazir Barekzi)

Biology

The soil sample suspected of containing bacteriophage was taken from Chesapeake, Virginia from Jack's backyard. The sample was enriched and then our lab performed various dilutions, each time either streaking or spotting dilutions to check for consistent plaque morphology. A medium and high titer lysate were both synthesized and checked for purity. The strain isolated is somewhat temperate and has shown polymorphic plaque morphology. DNA assays were performed and results are outlined.

9) Ele-FH1 Discovery: Capture, Purification, and Preliminary Characterization

By **Shay Fizer, Carolyn Henderson** (Mentor Dr. Nazir Barezzi)

Biology

One of the issues that presents itself in contemporary medicine is antibiotic resistance. Ele-FH1 is a lytic-on-lysogenic bacteriophage virus that infects *Mycobacterium smegmatis*. The identification and characterization of the bacteriophage will potentially facilitate the development of alternative therapeutics for the slow growing *Mycobacterium* species such as *M. tuberculosis*. A soil sample was enriched by use of a metallic ion for attachment and a high concentration of *Mycobacterium smegmatis* to encourage the growth of any phage that might have been present. After isolation, several rounds of purification via stick streak and serially diluted spot tests were performed. Visualization of plaque morphology as well as analysis of the electron micrographs were then used to confirm the purity of the virus. Although *M. smegmatis* seems to be a suitable host for the phage, further analysis of the DNA sequence *in silico* will confirm the identity of the bacteriophage. The ability of Ele-FH1 to increase the bacterial competence to bactericidal vectors may be evaluated in the future.

10) Conservation Status of Coral Reef Fishes in Oceania, with an emphasis on Halfbeaks and Frogfishes

By **Corina Radtke** (Mentor: Dr. Kent Carpenter)

Biology

The island countries of the western central Pacific Ocean are heavily dependent on the marine environment. This region has experienced intensified threats from coastal habitat destruction, over-fishing, and pollution, which has resulted in documented declines in many marine populations. The IUCN Red List of Threatened Species, an internationally accepted system to quantify species' conservation status, is being applied to reef-associated marine fishes of the region. These assessments, including those for halfbeaks (Hemiramphidae) and frogfishes (Antennariidae), are a first step in prioritizing biodiversity conservation efforts in the region.

11) Comparative Genomics of the Human and Animal Pathogen *Mycobacterium marinum*

By **Dillion Matthews, Ehsan Jafree, Miranda Ryan, Abhishek Biswas** (Mentors: Dr. Desh Ranjan Dr. Mohammed Zubair, Dr. David Gauthier)

Chemistry and Biochemistry, Biology, Computer Science

Major mycobacterial pathogens of humans, such as *M. tuberculosis*, *M. leprae*, and *M. ulcerans*, are thought to derive from generalist environmental ancestors. A great deal of research has focused on the genomics of these pathogens, however, much less is known about mycobacteria that largely retain capability to survive in the ancestral environmental niche. The *M. marinum*-like group of bacteria is representative of these environmental ancestors, in that its members retain relatively large genomes and diverse metabolic pathways for coping with diverse conditions and energy sources. In this work, we present preliminary results of a whole-genome comparative study of over 30 strains of *M. marinum*, including genomic phylogeny and analysis of core and accessory genomes.

12) Investigating nanocapsule uptake in neural immune cells

By **Caleb Holland** (Mentor Dr. Christopher Osgood)

Biology

Nanotechnology has the potential to address many shortcomings of current pharmaceutical treatment options. This project investigated one possible application of nanotechnology: to improve treatment of diseases and disorders of the brain and central nervous system. We tested whether dendritic cells of the murine cerebellum would take up nanocapsules, and were able to demonstrate that the cells would in fact safely take up the nanocapsules. We then experimentally inhibited certain pathways to determine the means of uptake. Further investigation using macrophages demonstrated the pathway of uptake to be receptor-mediated endocytosis.

13) A case study of a patient diagnosed with Tidewater spotted fever (*Rickettsia parkeri rickettsiosis*)

By **Cameron Lenahan** (Mentor: Dr. Dr. Holly Gaff)

Biology

In this case study, we observe a patient who was recently diagnosed with *Rickettsia parkeri rickettsiosis* or Tidewater spotted fever. This is a disease arising from a bacterium, *Rickettsia parkeri*, a member of the spotted fever group. Until 2002, *R. parkeri* was believed to be nonpathogenic. The patient had developed an eschar and samples were taken. After serology provided negative titers, the identification of the bacterium was confirmed through PCR.

14) Observations of the behavior of the American dog tick when placed in an environment to promote water loss

By **Jonathan Malush** (Mentor: Dr. Holly Gaff)

Biology

This experiment is an attempt to determine if dog ticks (*Dermacentor variabilis*) would try to hide under the soil to prevent water loss when faced with conditions in which they could dehydrate. The ticks were placed in an environment in which they began to lose water through natural desiccation. One group had leaf litter under which to hide, the other had only bare soil. After one week of observation and measurement of temperature and humidity, the reactions of the ticks to their environment were recorded. The control group hid underneath the leaf litter as expected, but the experimental group did not hide under the soil as was hypothesized. At the end of the experiment, the experimental group was dead, while the control group was still relatively active. In conclusion, dogs ticks do not appear to bury themselves into the soil layer to prevent desiccation.

15) Population estimates for *Amblyomma americanum*, lone star tick, at two sites within the Hampton Roads area of Virginia.

By **Anja Nilsson, Lindsey Bidder, Alexis White** (Mentor: Dr. Holly Gaff)

Biology

Ticks are one of the main vectors of human pathogens; therefore, we need to study them to better understand their phenology. The lone star tick is the dominant species within the Hampton Roads area of Virginia. During the summer of 2014, a mark-recapture study was conducted for nymph and adult lone star ticks at two field sites, Newport News and Stephens. It was hypothesized the Newport News site would have a higher population estimate for both nymphs and adults. The Lincoln-Peterson index was used to analyze the mark-recapture data. Newport News had a population estimate of 1561 ± 319 total nymphs compared to 578.5 ± 765.3 at Stephens. Adults were 102 ± 58.4 and 69.5 ± 47.6 respectively. These results imply that there is a greater risk of coming in contact with a lone star tick in the Newport News area.

16) Identification of hosts for ticks in the Hampton Roads area

By **Carter Watson, Robyn Nadolny** (Mentor: Dr. Holly Gaff)

Biology

Ticks are the most common vector of disease in the US, and ticks and tick-borne diseases have increased dramatically over the past twenty years moving into new areas. To better understand the dynamics of these diseases, it is imperative to identify the wildlife hosts of ticks. Ticks were collected throughout the Hampton Roads area on many different types of animals. These ticks were collected through a variety of means including hunt check stations, veterinary donations and road kill convenience sampling. 60% of all the data collected were lone star ticks (*Amblyomma americanum*), followed by deer ticks (*Ixodes scapularis*) with 14% and dog ticks (*Dermacentor variabilis*) at 13%. The lone star tick was found on 100% of the host species in our data. Deer had the highest amount of overall ticks with 52% of total ticks collected. These findings will help to better understand range expansion of tick-borne diseases.

17) HNRS 201 Monarch Think Tank: Building the Foundation for the ODU Peer Transition Assistants Program

By **Sarah Bender, Elizabeth Forgey, Megan Hept, Maurice Jones, Ciarra McPhail, Aiyenne Payne, Erikka Robinson Carrie Sensenig, Zachary Williams** (Mentor: Dr. Tammi Milliken)

Counseling and Human Services

Students participating in the HNRS 201 Monarch Think Tank course during Fall 2014 have had the opportunity to pioneer the Peer Transition Assistants Program at ODU. The purpose of this presentation is for students in this course to showcase the impressive work they engaged in throughout the semester. Specifically, they will present the literature they reviewed to gain an understanding of the difficulties incoming freshmen and transfers experience entering the higher education environment. Further, they will describe effective peer mentorship models and ways in which their plan fills existing gaps. The students will also describe their experience developing, implementing, and analyzing qualitative and quantitative needs assessments of students at ODU. Finally, based on both the reviews of existing programs and the results from their needs assessments, the students will define their vision for the Peer Transition Assistants Program to be developed and piloted during the Spring 2015 semester.