



**Friday, May 2, 2014**

10 a.m. – 1 p.m. / Science Building Atrium





## 2014 Western Research Day Schedule Friday, May 2, 2014

|                     |   |
|---------------------|---|
| 9:00 AM - 10:30 AM  | Poster setup<br>Location: Science Building Atrium   |
| 10:00 AM - 10:30 AM | <b>Keynote Speaker,</b><br>Eric Martone, Mercy College<br>Location: Science Building, Room 125          |
| 10:30 AM - 12:45 PM | <b>WRD Poster Session</b><br>Location: Science Building Atrium  |
| 12:45 PM - 1:00 PM  | <b>Announcement of the winners<br/>&amp; concluding remarks</b><br>Location: Science Building, Room 125 |

Refreshments will be served during the poster sessions in the Atrium of the Science Building.

## KEYNOTE ADDRESS

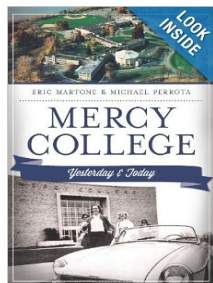
### Dr. Eric Martone

Dr. Martone is an Assistant Professor of History and Social Studies Education at Mercy College. Aside from his Ph.D. and B.A., he has 2 M.A. degrees (one from Western) and teacher certification (also from Western).

The title of his talk will be: [Set Yourself Up for Success: The Value and Practical Applications of Student Research and Publications](#)

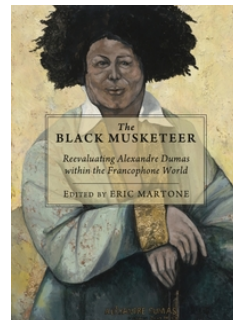
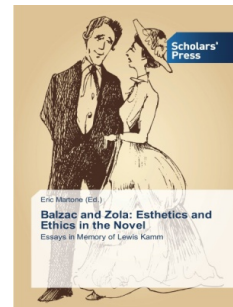


At Mercy College in Dobbs Ferry, New York, Dr. Martone became the founding faculty advisor to the School of Education graduate student journal, the *Mavericks' Education Journal*, to promote student research. Prior to earning his Ph.D. in history from Stony Brook University, he completed a master's degree in history as well as a teacher certification program at Western Connecticut State University. He also has a B.A., in history from Pace University, an M.A. in history from Iona College, and a certificate in French from the University of Toronto. Before beginning his career in higher education, he was a social studies teacher in



Waterbury, Connecticut. In 2011, he received the John Rogers Memorial Award from the Connecticut Education Association in recognition of his leading contributions in the areas of teaching and scholarship. In 2013, he was recognized by Kappa Delta Pi, the international honor society for education, as a "Teacher of Honor." He is the author of nearly 20 book chapters and peer-reviewed articles, which have appeared in such journals as the *Journal of Global History* and the *International Social Science Review*. He has also published over 100 reference articles and book reviews. His research has received financial support from such organization as the National Endowment for the Humanities and the American Historical Association. His books include *Royalists, Radicals*

and *les Misérables: France in 1832* (2013), *Mercy College: Yesterday and Today* (2013), *The Black Musketeer: Reevaluating Alexandre Dumas within the Francophone World* (2011), and the *Encyclopedia of Blacks in European History and Culture* (2009). He is currently finishing two monographs on the social memorialization of the French writer Alexandre Dumas, author of *The Three Musketeers* and grandson of a Caribbean slave, to examine changing perceptions of French identity during colonial and post-colonial eras in both the metropole and among overseas populations. As a sought-after specialist on topics in European history, he has been interviewed on national radio and in 2012 even received (but, unfortunately, had to decline) an invitation to be a guest commentator on the BBC show, *Newsnight*.



## Student Participants

| Num | Name  | Title   |
|-----|---|---|
| 1   | Brittany Bresha   | Universal Perceptions of Beauty   |
| 2   | Meghan Bresson  | Establishing the origin <i>Lepidochelys olivacea</i> females nesting in Campamento La Gloria, Jalisco, Mexico.  |
| 3   | Matthew Burrow, Kaitlyn McNally, Ryan Purwin, Elizabeth Semple, Jacqueline Mino, and Cassie Griffin | Comparative Analysis of Aquatic Eukaryotic Populations in Lakes Lillinonah and Candlewood   |
| 4   | Mauro Campoverde  | The world of Julio Cortázar: Imagination without limits.  |
| 5   | Malina Choi   | Introverts and Extroverts Within Relationships  |
| 6   | Jenna Cimaglia  | Self-Objectification, Self-Esteem, & Gender   |
| 7   | Alicia Collazo Rosado   | Dual-Code Theory, Contextual-Availability Theory, and Recall of Concrete and Abstract Words   |
| 8   | Sean Congdon  | The Effects of Axis Orientation on Visual Spatial Skill   |
| 9   | Nicholas Darinzo and Patrick Finneran   | Expression and Purification of <i>Plasmodium falciparum</i> Cytochrome c  |
| 10  | Adrianne Davidoski  | Cardiovascular Disease & the Latino Community   |
| 11  | Brandon DeSocio   | Bugs, Dogs and Katz: Can 4th Amendment Trespass Doctrine Expand the Right to Privacy?   |
| 12  | Robert Dolan  | Audio Watermarking Using M-Band Wavelets  |
| 13  | Sean Ferguson, Michael Oldakowski, Karen Cabrera, Gina Bonacci, Meghan Bresson, and Amanda Halim    | Metagenomic Analysis of COI Gene in Eukaryotic Plankton Species of Lake Zoar and Lake Lillinonah  |
| 14  | Patrick Finneran  | The role of Cytochrome C in the Programmed Cell Death Pathway of the Malaria Parasite. A Comparison with Yeast Apoptosis Pathway.                     |
| 15  | David Haliczzer   | Overview of the 1974 Tornado Outbreak and the 2011 Tornado Outbreak   |
| 16  | Alexa Haynes  | The Harm of Beauty: A Textual Analysis  |
| 17  | Valarie Henry   | Masks of <i>Green Bird</i>  |
| 18  | Moon Seok Kim   | Method Development for Analyzing Pharmaceuticals in Water Samples by GC-MS  |
| 19  | Matthew Korduner  | The Effects of Practice on Mental Rotation  |
| 20  | Kristina Kruse  | False Memories: The Effect Of Emotional Context On The Intrusion Of Unpresented Targets   |
| 21  | Socheata Lim  | Expression and purification of glutathione reductase of <i>Plasmodium falciparum</i> as an antimalarial drug target                                   |
| 22  | Socheata Lim and Jeffrey Divino (UConn)   | Expression of the Na-K-Cl cotransporter in the gills of the three-spined stickleback ( <i>Gasterosteus aculeatus</i> ) and its role in osmoregulation |

| Num | Name  | Title  |
|-----|---|--|
| 23  | Adam Lurie  | A Statistical Analysis of Seasonal Activity of Tropical Cyclones: 1949 – 2013                                |
| 24  | Neil Malik, Volpe, Samantha Taddonio and Cody Cullens | The Importance of Security Programming in Modern Society   |
| 25  | Carlos A. Menjivar                                    | Cloning, expression, and purification of <i>Plasmodium falciparum</i> serine-hydroxymethyltransferase        |
| 26  | James S. Molina                                       | Photochemistry of Metallated Water-Soluble Porphyrins and Bacterochlorins                                    |
| 27  | Chelsea Mone  | The Relationship between Social Networking Sites and Self-Esteem   |
| 28  | Andrew Nelson   | Congressional Junketing? Determinants of Congressional International Travel                                  |
| 29  | Amanda O'Boy  | The similarities of motherhood used as a political tool in Medieval Europe and the United States of America. |
| 30  | Michael Oldakowski                                    | Comparing two PCR-based methods for detecting tickborne pathogens: Are old methods as good as new ones?      |
| 31  | Erick Orozco and Jessica Hensel                       | Identification of Eukaryotic Communities in Candlewood Lake from 2011-2012                                   |
| 32  | Mallory Papp  | Predicting Geographic Distribution of Water Plants in South American Rivers with GIS                         |
| 33  | Taylor Pasquence                                      | A Metagenomic Analysis of Lake Zoar's Eukaryotic Plankton Community in 2012                                  |
| 34  | Joshua Riddle   | <i>Saving Candlewood</i>   |
| 35  | Daniel Riney  | The Cost for Kick-Off: Examining the Economic Impact of Hosting the World Cup                                |
| 36  | Tate Rogers   | Vector Calculus + Technology=Beautiful seashells   |
| 37  | Kayla Ryan  | Latinas in Hollywood: Spitfires, Love Goddesses, and the Breaking of Stereotypes                             |
| 38  | Kelby Sandoval  | Effect of Nostalgia on Recognition   |
| 39  | Nichole Shortman                                      | "Sheathed in Velvet": Heterosexual Desire in Parade's End  |
| 40  | Juliann Sima and Lydia Walter                         | Proteases as triggers of apoptosis in the malaria parasite   |
| 41  | Ross Sommo  | Characterization of a HAD Phosphatase From <i>H. Pylori</i> J99  |
| 42  | Robert Toth   | Examination of Na-K-Cl Cotransporter protein activity in the Gills of Migrating Atlantic Salmon              |
| 43  | George Trejo Jr. and Tate Rogers                      | Hybrid Image Compression by combining DCT and 4-Band Wavelet Transform                                       |
| 44  | Victoria Tumino                                       | The Effects of Context on Competency Ratings   |
| 45  | Rebecca Warren  | Tweezers vs. Fingers: An Analysis of Tick Removal Methods  |
| 46  | Taylor Wolff and Taylor Pasquence                     | Prosecutorial Opinion and Racially Discriminatory Sentences of the Prison Industrial Complex                 |
| 47  | Tyler Wooldridge                                      | The Kepler Problem: Cross-road of Mathematics, Physics, and Reality  |
| 48  | Elana Yaghsizian                                      | The Nature of Eye Movements During Mental Rotation   |

## Faculty Participants

### Research Sponsors

#### Faculty

Dr. Katherine Allocco  
Dr. Galina Bakhtiarova  
Mr. JC Barone  
Dr. Neeta Connally  
Dr. Matthew Dabros  
Dr. Terrence Dwyer  
Dr. Gancho Ganchev  
Dr. Bernard Gee  
Dr. Rondall Khoo  
Dr. Heather Levy  
Ms. Pamela McDaniel  
Dr. Yuan Mei-Ratliff  
Dr. Michelle Monette  
Dr. Lydia Novozhilova  
Dr. Patricia O'Neill  
Dr. Albert Owino  
Dr. C. Thomas Philbrick  
Dr. Theodora Pinou  
Dr. J. Helena Prieto  
Dr. Rachel Prunier  
Dr. Anne Roberts  
Dr. Casey Rudkin  
Dr. Russell Selzer  
Dr. Alba Skar  
Dr. Xiaodi Wang  
Dr. Laurie Weinstein  
Dr. Edwin Wong

#### Department

History  
World Languages  
Communications/Media Arts  
Biological and Environmental Sciences  
Political Science  
Justice and Law Administration  
Computer Science  
Psychology  
Psychology  
English  
Theatre Arts  
Chemistry  
Biological and Environmental Sciences  
Mathematics  
Psychology  
Meteorology  
Biological and Environmental Sciences  
Biological and Environmental Sciences  
Chemistry  
Biological and Environmental Sciences  
Chemistry  
Writing  
Chemistry  
World Language  
Mathematics  
Social Sciences  
Biological and Environmental Sciences



## Abstracts Poster Presentations

*Listed in alphabetical order by first author*

### 1 Universal Perceptions of Beauty

*Brittany Bresha*

*(Dr. Galina Bakhtiarova, World Languages)*

This research explored the universalities of human nature in terms of how we perceive, internalize and produce beauty in our daily lives. Drawing on centuries-long traditions of representing the human body in ancient African and Turkish cultures, Grecian sculptures and European paintings, I demonstrated that these images represent laws of human attraction which have been theorized throughout history by some of the greatest minds of our times, from ancient Roman philosophers to 19th century and modern day evolutionary scientists. This research is a chronological observation of the race between culture and its evolution, culminating in an analysis of the ways in which we as humans ultimately explore, express and enforce our collective understanding of beauty within society.

### 2 Establishing the origin *Lepidochelys olivacea* females nesting in Campamento La Gloria, Jalisco, Mexico.

*Meghan Bresson*

*(Dr. Theodora Pinou, Department of Biological and Environmental Sciences)*

The olive ridley turtle, *Lepidochelys olivacea*, was nearly extinct a few decades ago due to human activity resulting in relatively low levels of genetic diversity. The results of this study test if a nesting beach of the Mexican Pacific significantly contributes to genetic diversity of the species. Identifying a genetically rich beach implores its conservation priority status. The study also addresses the genetics in post-nesting migration behavior in *L. olivacea* by comparing satellite migration patterns to population structuring. The study adds to our understanding of breeding behaviors, breeding population sizes, and the relationship between lineage and post-nesting migration patterns.

### 3 Comparative Analysis of Aquatic Eukaryotic Populations in Lakes Lillinonah and Candlewood

*Matthew Burrow, Kaitlyn McNally, Ryan Purwin, Elizabeth Semple, Jacqueline Mino, and Cassie Griffin*

*(Dr. Edwin Wong, Biological and Environmental Sciences)*

Aquatic invasive species are frequently introduced to local bodies of water, including Lakes Lillinonah and Candlewood. Such foreign organisms severely disrupt native ecology by clearing water of food sources, like plankton, necessary for the survival of native aquatic species. Plankton samples collected in June 2011 from Lillinonah and Candlewood underwent metagenomic analysis using Cytochrome Oxidase I, a “barcode” gene useful for identifying eukaryotes. Genes were amplified, transformed into plasmids, and sequenced. Data will serve as a baseline for comparisons of aquatic eukaryotic populations before and after the introduction of invasive species.

### 4 The world of Julio Cortázar: Imagination without limits

*Mauro Campoverde*

*(Dr. Galina Bakhtiarova, Spanish)*

The stories of Argentinean writer Julio Cortázar expand the limits of imagination by exploring fantastic scenarios beyond the rational domain. Cortázar’s literature stimulates the mind to think critically and search for irrational explanations in order to find the true essence of his art. This research explores the ways in which Cortázar questioned what was considered real and fantastic, the methods he used to create his stories, and how his work influenced an entire generation of artists.

## 5 Introverts and Extroverts Within Relationships

*Malina Choi*

*(Dr. Rondall Khoo, Psychology)*

The purpose of this research is to examine relationships between extroverts and introverts, and their happiness levels. The study will show which personality types may be more compatible and tests the hypothesis that similar personality types are more likely to have high happiness levels.

## 6 Self-Objectification, Self-Esteem, & Gender

*Jenna Cimaglia*

*(Dr. Rondall Khoo, Psychology)*

This research examines how self-objectification influences an individual's self-esteem. Objectification is largely influenced by the media which sets the example of what is considered to be attractive, or unattractive, especially for females. In comparing themselves to such examples, individuals reflect more on how they appear to others. It is hypothesized that higher levels of self-objectification will indicate lower self-esteem, and that women will report higher levels of self-objectification and lower levels of self-esteem than men.

## 7 Dual-Code Theory, Contextual-Availability Theory, and Recall of Concrete and Abstract Words

*Alicia Collazo Rosado*

*(Dr. Rondall Khoo, Psychology)*

The purpose of this study is to examine whether the Dual-Coding Theory and the Context-Availability Theory are correct in explaining the concreteness effect found in highly concrete words. The study will examine whether the processes involved in these two theories can be applied in order to increase learning and memory of abstract words by applying contextual clues and stimuli which will help these words activate the processes involved in those theories.

## 8 The Effects of Axis Orientation on Visual Spatial Skill

*Sean Congdon*

*(Dr. Bernard Gee, Psychology)*

How we perceive changes in our visual world is an area of research that both cognitive and biological psychologists continue to study vigorously. This research is examining how cognition varies depending on how we perceive objects in our environment via visual processing differences related to depth and angular disparities. Participants' performances are being evaluated through an analysis of reaction times and accuracy in relation to differences in the orientation of the axis of rotation that the stimuli are being presented along.

## 9 Expression and Purification of *Plasmodium falciparum* Cytochrome c

*Nicholas Darinzo and Patrick Finneran*

*(Dr. J. Helena Prieto, Chemistry)*

*Plasmodium falciparum* is one of the most common parasites causing the disease malaria. One of *P. falciparum*'s proteins, cytochrome c, has been implicated in cell death for this organism. In order to produce quantities of this protein for study, heterologous expression and purification of the protein were attempted. Two plasmids coding for an array of enzymes were introduced to produce and properly assemble the protein using C41 and C43 E. coli cells. The ultimate goals of this research are to test the produced Cytochrome c against malaria cells, thus elucidating the role of this protein.

## 10 Cardiovascular Disease & the Latino Community

*Adrianne Davidoski*

*(Dr. Alba Skar, World Languages)*

This research examines the issue of cardiovascular disease in Latino communities, both nationally and locally. By analyzing published research studies, journal articles, and documentaries, I have summarized information that is already known about cardiovascular disease in the Latino community and identified that which requires further research. The findings indicate that cardiovascular disease in the Latino community is affected by socioeconomic, cultural-ethnic, and genetic components.

# 11 Bugs, Dogs and Katz: Can 4th Amendment Trespass Doctrine Expand the Right to Privacy?

Brandon DeSocio

(Dr. Terrence Dwyer, Justice and Law Administration)

In today's digital age the idea of privacy is becoming a blurred line. Several vexing issues have emerged involving the right to privacy and the warrant requirement. Law enforcement can now obtain information without physically intruding on a person's possessions or property. These advancements have consistently outpaced the court's definition of what constitutes a search. This body of research examines the development of law enforcement technology, court decisions, and the future implications they will have on our everyday lives. This examination will take a closer look at the use of GPS monitoring, thermal imaging, and the use of police canines.

# 12 Audio Watermarking Using M-Band Wavelets

Robert Dolan

(Dr. Xiaodi Wang, Mathematics)

As digital music has become increasingly popular, there is a need to further develop a method to enhance copyright protection in the music industry. We address this problem by providing a new methodology to protect against unauthorized copying of digital music. By inserting a watermark in the audio file through the use of discrete wavelet transforms and other statistical means, this proposed watermark algorithm will achieve two goals: (1) the embedded watermark will not affect the quality of the audio in any way; (2) the watermark should be able to prevent common attacks that could remove or destroy the watermark, such as re-sampling, compression, amplitude scaling, and time scaling. In addition, techniques related to quantum computing were also applied in order to offer an even greater form of security.

# 13 Metagenomic Analysis of COI Gene in Eukaryotic Plankton Species of Lake Zoar and Lake Lillinonah

Sean Ferguson, Michael Oldakowski, Karen Cabrera, Gina Bonacci, Meghan Bresson, and Amanda Halim

(Dr. Edwin Wong, Biological and Environmental Sciences)

In order to gain an understanding of species composition in Lake Lillinonah and Lake Zoar, a metagenomic comparative study was done using the eukaryotic COI barcode gene. Plankton samples were collected in June 2012 in the lower southern regions of both lakes. These samples are representative of the types of organisms that were present during early invasion of these lakes by the European zebra mussel, *Dreissena polymorpha*. This study provides a baseline for future studies to observe any changes and adverse effects on the ecosystem due to invasive species.

# 14 The role of Cytochrome C in the Programmed Cell Death Pathway of the Malaria Parasite. A Comparison with Yeast Apoptosis Pathway.

Patrick Finneran

(Dr. J. Helena Prieto, Chemistry)

An unpublished study using *Plasmodium falciparum* demonstrated that proteins of the apoptotic pathway are affected by drug treatment. To address whether this plays a functional role, an assay will be developed in yeast lysate to test the downstream activation of a peptidase by using increasing amounts of cytochrome c. A new signaling peptide is being developed to determine if this apoptotic pathway is activated. The first step of the synthesis has been completed and characterized. This research is beneficial since it will help with further understanding malaria protozoa and could lead to drug discovery.

## 15 Overview of the 1974 Tornado Outbreak and the 2011 Tornado Outbreak

David Haliczzer

(Dr. Albert Owino, Meteorology)

Tornadoes are localized mesoscale (study of atmospheric phenomena between 10 km and 1,000 km) events that can occur when the key components occur together. The key components are: 1. Clash of Air masses (mT (Maritime Tropical – warm and moist), cP (Continental Polar, cold and dry) and cT (Hot and dry) 2. Big broad, warm moist warm sector 3. Strong upper level jet stream and strong LLJ to create a big broad area of wind shear 4. Strong cold front, and mesoscale features to initiate convection This research will feature a complete analysis as to why these events happened.

## 16 The Harm of Beauty: A Textual Analysis

Alexa Haynes

(Dr. Casey Rudkin, Writing)

Lisa Loomer's *The Waiting Room* demonstrates how struggling to achieve physical beauty, whether past or present, can negatively affect one's life. This play focuses on struggles of three women who altered themselves to achieve their societies' unique beauty standard and the consequences of those actions. This research explains how the play uses real world examples in a dramatic fashion to demonstrate the unnecessary pain these women undergo to be "beautiful" and establish the different, highly subjective forms of beauty, showing that beauty is individual and, therefore, not important enough to go through physical harm to achieve.

## 17 Masks of Green Bird

Valarie Henry

(Ms. Pamela McDaniel, Theatre Arts)

For the commedia del'arte production of *Green Bird* in the theatre department, I researched classical commedia del'arte masks of the original Italian art and modern interpretations to complete six masks for the main characters. In addition to making these paper mache masks that enhanced the production of *Green Bird*, I was honored by the Kennedy Center American College Theatre Festival.

## 18 Method Development for Analyzing Pharmaceuticals in Water Samples by GC-MS

Moon Seok Kim

(Dr. Yuan Mei-Ratliff, Chemistry)

Modern societies are saturated with pharmaceutical products. Today, all over the world, both prescription and over-the-counter drugs are prevalent in all bodies of environmental water, including wastewaters, surface waters, and even drinking water supplies. Because the effects of drug compounds in the environmental water are mostly unknown, close monitoring of this new type of water pollution is needed. The aim of the research project is to develop cost effective methods for analyzing water samples for multiple pharmaceutical compounds using solid phase extraction followed by GC-MS analysis.

## 19 The Effects of Practice on Mental Rotation

Matthew Korduner

(Dr. Bernard Gee, Psychology)

An integral part of human cognition is visuospatial reasoning. For example, mental rotation, the ability to visualize multiple perspectives of an object, can help us interact with our world in an efficient manner. Tasks as ordinary as figuring out where to fit the last suitcase in a tightly packed car are possible because of this visuospatial ability. By comparing videogame training and mental rotation task training, this study looks to provide further insight into which practice exposures are optimal for improving this specific skill-set. This is important for expanding our understanding of human cognition and visuospatial reasoning.

## 20 False Memories: The Effect Of Emotional Context On The Intrusion Of Unpresented Targets

Kristina Kruse

(Dr. Patricia O'Neill, Psychology)

The link between emotions and memories can enhance the capacity of memory as well as the ability to retrieve information. Certain emotional connections to memories can also have an effect in the creation and retrieval of false memories. This study is designed to evaluate the effect of emotional context on false recall, and whether or not gender is related to the false recall of such information. It is hypothesized that the probability of false recall will be higher for emotional context and that females will be more likely to falsely recall emotionally charged context.



## 21 Expression and purification of glutathione reductase of *Plasmodium falciparum* as an antimalarial drug target

*Socheata Lim*

*(Dr. J. Helena Prieto, Chemistry)*

*Plasmodium falciparum* is the cause of human malaria and is one of two malaria parasites known to have drug resistance. An effective therapy to human malaria is to use antimalarial drugs such as methylene blue (MB). At a specific concentration, MB has shown to inhibit the parasite's glutathione reductase (PfGR), a proven drug target that is important for cellular repair mechanisms. In this study, PfGR was expressed and purified for a future study that will utilize H/D exchange with mass spectrometry to examine PfGR's interaction with methylene blue.

## 22 Expression of the Na-K-Cl cotransporter in the gills of the three-spined stickleback (*Gasterosteus aculeatus*) and its role in osmoregulation

*Socheata Lim and Jeffrey Divino (UConn)*

*(Dr. Michelle Monette, Biological and Environmental Sciences and Dr. Eric Schultz (UConn) )*

Three-spined sticklebacks are euryhaline fish that can acclimate to varying levels of salinity. Given what's known about osmoregulation in other euryhaline fishes, we predicted that protein expression of the Na-K-Cl cotransporter (NKCC) would be regulated in the gills of sticklebacks upon exposure to changing salinity. We hypothesized that NKCC would increase upon acclimation to saltwater and decrease upon acclimation to freshwater. To test this, we performed salinity acclimation experiments in the lab and used biochemical techniques to examine protein expression of NKCC in stickleback gills. We anticipate that our results will augment the understanding of mechanisms of osmoregulation in sticklebacks.

## 23 A Statistical Analysis of Seasonal Activity of Tropical Cyclones: 1949 – 2013

*Adam Lurie*

*(Dr. Casey Rudkin, English)*

This research examines the seasonal activity of tropical cyclones providing an analysis of tropical cyclones for the last sixty-four years (1949 – 2013). Research focuses on the North Atlantic, the North East Pacific, and the North West Pacific Oceans. It is hypothesized that global warming would cause more active storms per season; however, contrary to popular belief, the activity level is cyclic and is not increasing.

## 24 The Importance of Security Programming in Modern Society

*Neil Malik, Gregory Volpe, Samantha Taddonio and Cody Cody Cullens*

*(Dr. Gancho Ganchev, Computer Science)*

The massive increase in use of technology over the last few decades has created a new problem: security. With large volumes of personal data entering or being transferred through electronic devices, the problem of protecting sensitive data is becoming more difficult. The purpose of this research examines the different methods of security used and being developed to better secure private data. The analysis will be specific to Java, one of the largest platforms present on devices around the world.

## 25 Cloning, expression, and purification of *Plasmodium falciparum* serine-hydroxymethyltransferase

*Carlos A. Menjivar*

*(Dr. J. Helena Prieto, Chemistry)*

Due to the increase in drug resistance against known antimalarial drugs and slow progress in the development of a malaria vaccine, there is an urgent need for new potential targets that are unique to the parasite in order for treatment of the disease to be possible. Quantitative proteomic experiments under drug pressure have given clues into targets for antiparasites using a quantitative approach. *Plasmodium falciparum* serine hydroxymethyltransferase (SHMT), an enzyme found in the dTMP synthesis cycle, is a potential target for new drugs in malaria and even potential cancer research. SHMT has been found in the preliminary proteomics data as upregulated. By methods of cloning, expression, and purification we are investigating differences between the parasite and human enzyme. Due to the lack of research in this area, further investigation of the structure and function of the enzyme is needed.

## 26 Photochemistry of Metallated Water-Soluble Porphyrins and Bacterochlorins

*James S. Molina*

*(Dr. Russell Selzer, Chemistry)*

Porphyrins represent one of the most important and prevalent structural groups in nature. Compounds containing porphyrins have been the subject of basic and applied research for many decades, especially in the field of photochemistry. Porphyrins are molecules of interest in research involving solar energy conversion and photodynamic therapy. These structures appear in chlorophyll and hemoglobin in a metallated form, and have recently been incorporated into nanostructures within this laboratory and others. The photochemistry of water-soluble porphyrins was studied. Starting with the commercially available compound, tetrasodium meso-tetrakis(4-sulfonatophenyl) porphyrin, the zinc, copper, and cadmium metallated analogs were synthesized. The absorption spectra of the triplet excited state was determined using laser flash photolysis. The kinetics of the reactions of the excited states were studied with 9,10-anthroquinone-2,6-disulfonic acid disodium salt and 4,5-dihydroxyl-1,3-benzene disulfonic acid disodium salt as quenchers to determine the quenching constant.

## 27 The Relationship between Social Networking Sites and Self-Esteem

*Chelsea Mone*

*(Dr. Rondall Khoo, Psychology)*

The purpose of this study is to examine whether there is a relationship between the usage of multiple social networking sites, social well-being and self-esteem. Subjects were asked to complete four different surveys on personality, self-esteem, social networking and self-esteem relating to usage of social networking. A multiple linear regression analysis was used between multiple social networking sites, social well-being and self-esteem.

## 28 Congressional Junketing? Determinants of Congressional International Travel

*Andrew Nelson*

*(Dr. Matthew Dabros, Political Science)*

Congressional foreign travel has been widely excoriated by journalists and watchdog organizations; indeed, sensational exposés of foreign junketing are well known; however, international travel has received little scholarly attention. For example, we do not know how common foreign travel is, nor have we fully identified the types of members likely to travel overseas. This research explores common explanations and determinants for publicly funded foreign travel using data on the number of trips taken in the 107 – 112th Congresses (2001 – 2012). The analysis includes variables such as: age, gender, seniority, committee membership, electoral margin, race, political party and majority party.

## 29 The similarities of motherhood used as a political tool in Medieval Europe and the United States of America.

*Amanda O'Boy*

*(Dr. Katherine Allocco, History)*

Women have often been looked at as commodities. Although women have come a long way in North America to achieve equal rights, there is still an image that persists: women only as mothers. Medieval society perpetuated this image as a way for a patriarchal society to control women. This research demonstrates how motherhood was used as a political tool in medieval Europe and how it is also used today in the United States.

### 30 Comparing two PCR-based methods for detecting tickborne pathogens: Are old methods as good as new ones?

Michael Oldakowski

(Dr. Rachel Prunier and Dr. Neeta Connally, Biological and Environmental Sciences)

Blacklegged ticks can carry several human pathogens, including bacteria that can cause Lyme disease. Infections from these pathogens are becoming more prevalent within the state of Connecticut, so a reliable and inexpensive method needs to be identified for estimating the prevalence of these pathogens. Two molecular detection methods were used to screen ticks collected from four locations in western Connecticut. Ticks were screened for four pathogens using traditional gel electrophoresis visualized PCR and real time PCR techniques. Tick infection rates using both techniques were compared to see if these techniques are equally sensitive in detecting the presence of tick pathogen DNA.

### 31 Identification of Eukaryotic Communities in Candlewood Lake from 2011-2012

Erick Orozco and Jessica Hensel

(Dr. Edwin Wong, Biological and Environmental Sciences)

The zebra mussel is currently one of the most invasive species in the lakes and rivers on the east coast. Present in Lakes Zoar and Lillinonah, the zebra mussel has altered the ecosystem of both environments, with more changes to come. The Zebra Mussel has not yet appeared in Candlewood Lake, and efforts are being made to prevent invasion. Metagenomic analysis was used to analyze the eukaryotic plankton in two Candlewood Lake samples, one from August, 2011 and one from August, 2012, with the goal of identifying baseline plankton populations before any future invasion by zebra mussels.

### 32 Predicting Geographic Distribution of Water Plants in South American Rivers with GIS

Mallory Papp

(Dr. Neeta Connally and Dr. C. Thomas Philbrick, Biological and Environmental Sciences)

This study focused on assessing how current ecological factors influence the geographic distribution of species in the aquatic angiosperm family Podostemaceae (riverweeds) in South America. Plants in this family only grow attached to rocks in river-rapids and waterfalls. As rivers are the most heavily impacted of tropical aquatic habitats, it is important to be able to determine the extent of species geographic ranges. Geographic Information Systems (GIS) were used to assess the distribution of representative species relative to current ecological factors. Results indicate that the current distributions of species are not closely linked to variations in the ecological factors examined.

### 33 A Metagenomic Analysis of Lake Zoar's Eukaryotic Plankton Community in 2012

Taylor Pasquence and Alicia Gallo

(Dr. Edwin Wong, Biological and Environmental Sciences)

The Housatonic River extends from Massachusetts to Connecticut. It is ecologically important and has many uses, from recreational and industrial to being an important source of agricultural water supply. Lake Zoar is a reservoir of the Housatonic River formed by the Stevenson Dam. Several invasive species — such as Eurasian Water Milfoil, Brittle Water Nymph, and Zebra Mussels — have occupied Lake Zoar in recent years. However, there is little information known about the impact these invasive species have on the ecological community of eukaryotic plankton within the lake. This project set out to develop an initial 18S rRNA gene database of the plankton to see what impact the invasive species will have in future years.

### 34 ***Saving Candlewood***

*Joshua Riddle*

*(JC Barone, Communications/Media Arts)*

*Saving Candlewood* is a documentary that brings attention to the current and growing threat that the aquatic invasive species, the zebra mussel, poses to waterways connected to the Housatonic River, Candlewood Lake and the greater community at large. Using key interviews featuring members of Western’s biology department and the Candlewood Lake community, this work looks at the potential devastation this “aquatic hitchhiker” could cause to the ecosystem of the lake, as well as what is being done to prevent its further spread.

### 35 **The Cost for Kick-Off: Examining the Economic Impact of Hosting the World Cup**

*Daniel Riney*

*(Dr. Laurie Weinstein, Social Sciences)*

The aim of this research is to examine the economic effects of hosting an FIFA World Cup. Soccer is the world’s most popular sport, and the World Cup is the sport’s most prestigious event. Recently, there has been much debate over whether or not the World Cup provides an economic benefit to the host nation. This research examines economic indicators of host countries leading up to, during, and after the event. Displacement and other human rights issues that occur in the development stages of the event are illuminated.

### 36 **Vector Calculus + Technology=Beautiful seashells**

*Tate Rogers*

*(Dr. Lydia Novozhilova, Mathematics)*

Vector calculus tools can be used for modeling beautiful shapes created by nature, in particular, seashells. In this project, a Maple program was used to create a variety of seashells with both circular and non-circular apertures (openings). A real world shell model based on X-ray measurements and curve fitting techniques was also created. After conversion of a file with a seashell model into a format appropriate for 3D-printing, the shape can be materialized using this innovative additive manufacturing technique.

### 37 **Latinas in Hollywood: Spitfires, Love Goddesses, and the Breaking of Stereotypes**

*Kayla Ryan*

*(Dr. Galina Bakhtiarova, World Languages and Literature)*

For as long as Hollywood has created stars and icons, Hispanic actresses have been asked to change their appearance in order to be appealing and marketable. Stars like Lupe Velez and Rita Hayworth had to undergo a literal and figurative whitening process in order to get jobs. Today, Hispanic actresses Sofia Vergara, Eva Mendes, and Rosario Dawson are routinely cast as fiery women who are tan, have curves, and flip to speaking rapid Spanish when they’re angry. Young American Latina actresses Demi Lovato and Selena Gomez are fighting these stereotypes as they do not want to be typecast. I explored these two trends that originated in Old Hollywood, yet are forming a new culture in contemporary mass media.

### 38 **Effect of Nostalgia on Recognition**

*Kelby Sandoval*

*(Dr. Rondall Khoo, Psychology)*

This research examines whether nostalgia improves recognition. People tend to remember things that interest them and things that they are familiar with. Nostalgia involves both interest and familiarity. Subjects will be primed or not primed with nostalgia. Afterwards subjects will be asked to recognize either images that evoke nostalgia or non-nostalgic images. The nostalgic pictures will consist of cartoon characters that the subjects are most likely familiar with from their childhood. Non-nostalgic pictures will consist of uncommon Japanese anime characters. The effect of nostalgia on recognition will be explored.

### 39 **"Sheathed in Velvet": Heterosexual Desire in *Parade's End***

*Nichole Shortman*

*(Dr. Heather Levy, English)*

Desire is an undeniable aspect of human life. Ford Madox Ford's *Parade's End* tetralogy revolves around the story of Christopher Tietjens and his shifting desire between his wife, Sylvia, and Valentine Wannop, a woman with whom he is having an unconsummated affair. Throughout the series, Christopher and Sylvia's desires (romantic and otherwise) stand directly opposed to each other's, prompting a discussion of how accurately *Parade's End* displays the nuances of heterosexual desire.

#### 40 Proteases as triggers of apoptosis in the malaria parasite

Juliann Sima and Lydia Walter

(Dr. J. Helena Prieto, Chemistry)

The protozoan *Plasmodium falciparum* is the cause of malaria, a destructive disease found in the undeveloped world. Research has been conducted on protease involvement in the apoptosis of the *P. falciparum* cells. The proteases (MAL13P1, PF14\_0517, PF14\_0439M17, PF11\_031360S, and PF14\_0078) are up-regulated when the parasite was submitted to drug pressure (chloroquine) in the sub-lethal concentrations of 40, 80, or 160nM. At the same drug concentrations the parasite also showed signs of programmed cell death (apoptosis). The aim of this research is to identify proper techniques for the expression and purification of proteases to test their role in the apoptosis pathway.

#### 41 Characterization of a HAD Phosphatase From *H. Pylori* J99

Ross Sommo

(Dr. Anne Roberts, Chemistry)

*Helicobacter pylori* is a gram-negative bacterium that colonizes the gastric mucosa of the human stomach. *H. pylori* infection is known to cause gastric ulcers and cancer in some rare cases. Although the genome of *H. pylori* has been sequenced, the functions of many of its genes are not known. JHP\_1130 is one such gene; a hypothetical protein that has been identified as a member of the HaloAcid Dehalogenase (HAD) superfamily. The presence of three conserved sequence motifs indicates that JHP\_1130 is likely a phosphatase. The purified enzyme has been tested for activity against a variety of small-phosphorylated molecules and crystallization trials for protein structure determination are underway. The goal of this research is to determine the true *in vivo* substrate and metabolic function of JHP\_1130.

#### 42 Examination of Na-K-Cl Cotransporter protein activity in the Gills of Migrating Atlantic Salmon

Robert Toth

(Dr. Michelle Monette, Biological and Environmental Sciences and Dr. Stephen McCormick (UMass Amherst))

Atlantic salmon (*Salmo salar*) begin life in freshwater, migrate to saltwater, and return to freshwater to reproduce. Critical to their saltwater migration is the upregulation of gill ion transport proteins, which function to excrete salt. An *in vitro* experiment using excised gill tissue was conducted to address questions regarding the protein expression and activity of the Na-K-Cl cotransporter in the gills of migratory Atlantic salmon. Data collection is underway and it's anticipated that the information gained from this experiment will increase the understanding of Atlantic salmon biology and will help salmon restoration efforts in the northeastern United States.

#### 43 Hybrid Image Compression by combining DCT and 4-Band Wavelet Transform

George Trejo Jr. and Tate Rogers

(Dr. Xiaodi Wang, Mathematics)

Image compression remains a broad-spectrum for research. Digitalized image data is widely transmitted through multimedia, medical, and military communication. Effective distribution within a limited band-width and restricted storage space is essential. In this research we introduce a new hybrid compression method on digital images to test whether a greater compression ratio without compromising significant reconstruction quality can be achieved. Our hybrid compression algorithm utilizes the Discrete Cosine Transform and 4-Band Wavelet Transform to establish a four-dimensional transform technique effective in compressing large sets of data. The combination of these two compression techniques results in significant increase of the compression ratio.



#### 44 The Effects of Context on Competency Ratings

*Victoria Tumino*

*(Mr. Rondall Khoo, Psychology)*

This research examines whether positive or negative context has an effect on the participant's ratings of competency and attractiveness. Prior research has shown there is an attention bias toward negative information. People tend to remember and focus more on negative rather than positive attributes of other people. It is hypothesized that negative context will result in lower ratings of competency and attractiveness and positive context will result in higher ratings.

#### 45 Tweezers vs. Fingers: An Analysis of Tick Removal Methods

*Rebecca Warren*

*(Dr. Neeta Connally, Biological and Environmental Sciences)*

From a public health standpoint, assessing Lyme disease risk from tick specimens found feeding on humans or pets relies on proper tick removal. Public tick submissions collected as part of a Lyme disease prevention study in Connecticut were used to investigate whether tick removal techniques may hinder or ensure accurate tick identification and disease risk assessment. We assessed whether humans are more likely to use differing tick removal methodologies depending on the host (human or pet). Employing different approaches to tick removal (using fingers, tweezers, or another tick removal tool) were assessed to determine the degree of tick damage.

#### 46 Prosecutorial Opinion and Racially Discriminatory Sentences of the Prison Industrial Complex

*Taylor Wolff and Taylor Pasquene*

*(Dr. Laurie Weinstein, Social Sciences)*

This research determines the relationship between prosecutor opinion concerning racially discriminatory sentences and expressions of tension of political, economic, and social power in the prison industrial complex (PIC). Statements by prosecutors discussing sentences in which racial disparities are observed were collected to represent prosecutorial opinion in contemporary America. They were analyzed using an unobtrusive latent content analysis of themes codified as expressions of tension of political, economic, and social power. They were also analyzed for acknowledgements of a root cause. Results show prosecutorial opinion toward racially discriminatory

#### 47 The Kepler Problem: Cross-road of Mathematics, Physics, and Reality

*Tyler Wooldridge*

*(Dr. Lydia Novozhilova, Mathematics)*

Kepler's formulation of laws describing planetary motion inspired many great scientists to solve the equations of motion of planets in our solar system, and celestial mechanics became the experimental laboratory for discovery of new mathematics. The problem of stability of our solar system has not been solved entirely, but solutions have been found for some restricted versions. A rigorous solution for the two-body problem, the Kepler Problem, is known. I present visualizations of some analytical results for the Kepler problem. Specifically, animation of time dynamics will be shown on a PC screen. Numerical verification of Kepler's laws is also included.

#### 48 The Nature of Eye Movements During Mental Rotation

*Elana Yaghsizian*

*(Dr. Bernard Gee, Psychology)*

In order to interact with the world around us, we make over 10,000 eye movements each hour. This quintessential human behavior supports important visuospatial skills such as the ability to imagine objects from varying perspectives. This research tracks participant's eye movements during a mental rotation task. We efficiently extrapolate information about our environment. Thus, it is expected that participants will concentrate their fixations on specific regions of the visual stimuli that provide information about its spatial orientation. Little is known about the nature of eye movements during mental rotation; therefore, this research will further our understanding of spatial reasoning.

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