



2016 Western Research Day Schedule Friday, May 6, 2016

9:00 AM - 10:00 AM

Poster Setup

Location: Science Building, Atrium

10:00 AM - 10:30 AM

Opening Remarks

(Provost, Jane Gates)

Introduction of Keynote Speaker

(President, John Clark)

Keynote Speaker, Bill Devlin

Location: Science Building, SB 125

10:30 AM - 12:45 PM

WRD Poster Sessions

Location: Science Building Atrium

12:45 PM - 1:15 PM

Announcement of Provost Prize

Winners & Concluding Remarks

Location: Science Building, Room 125

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

2016 Keynote Speaker

William E. Devlin

Keynote speaker: Mr. William Devlin, M.A.

Title of Keynote Address: "Research as a Journey."

Mr. William Devlin graduated with a B.A. in History from Western Connecticut State University in 1976, and received his Master's in American Cultural History and Museum Studies from the University of Vermont in 1980. For the past 28 years he has taught History at Darien High School. During his career he has consulted for many historical preservation projects in Connecticut, including for the Danbury Preservation trust where he was responsible for the nomination of several Danbury landmarks to the National Register of Historic Places. He has written numerous feature length articles on local history for The News-Times, and for many years authored its "25 years ago in the Danbury area" column. Most recently he coauthored a book with WCSU Professor Emeritus Herbert F. Janick titled Danbury's Third Century: Urban Status to Tricentennial, published by Western Connecticut University Press.

Student Participants

Number	Name	Title	Department
1	Alam, Sadia Edwin Rojas	A Comparative Metagenomic Analysis of Candlewood Lake Sediment: The Rhizosphere of Eurasian Milfoil	Biological and Environmental Sciences
2	Borges, Michael	Synthesis of Dimethylphenyl Uridines	Chemistry
3	Campoverde, Mauro	Surrealism in the "Informe sobre ciegos"	Spanish - World Languages
4	Carrasco, Marisa Jason Augustine	The Effect of Attachment Anxiety and Social Rejection on Preferences for Material and Experiential Purchases	Psychology
5	Colombres, Amor-Lee	The Relationship between Priming Mindset and Change Blindness	Psychology
6	Conway, Joseph Robert Nordman Tristan Cornelis	Wage discrimination by race in the NBA	Economics
7	Dudhedia, Payal	The Efficacy of Botanical-Based Repellent, Geraniol, at Repelling Blacklegged Ticks	Biological and Environmental Sciences
8	Flerantin, Stephanie Nicole Mair Graham Gaddis	Can Money Buy Championships?: An Analysis of the Relationship between Wealth and Winning	Economics
9	Gallagher, Ryan	Study of the Formation and Evolution of Precipitation Induced Sea Surface Salinity Minima in the Tropical Pacific	Physics, Astronomy, and Meteorology
10	Garcia, Evelin Jenny Kry Emily Slade	Comparative Analysis of the Vaginal Microflora Between White and Minority Women	Biological and Environmental Sciences
11	Gillotte, Christopher	Floodplain Mechanics and the Active Transportation of Mercury in the Still River	Physics, Astronomy, and Meteorology
12	Giuliano, Alexander	Volatile Materials in Martian Polar Craters	Physics, Astronomy, and Meteorology
13	Hensel, Jessica	Synthesis of Fluorescent Uridines	Chemistry
14	Hensel, Jessica Devin Hack	The Stress Response in Mice as a Result of Sex of Handler	Biological and Environmental Sciences
15	Iapaluccio, Ben Vanele Dacosta Nicole Lamparelli Lori Taylor	Modeling Seed Dispersal of <i>Podostemaceae</i> by Birds	Biological and Environmental Sciences
16	Kelly, Terence Connor Quinn	Comparative Metagenomic Analysis of Bacteria in Spruce Rhizosphere and Bulk Soil	Biological and Environmental Sciences
17	Khalil, Charbel Luisa Encarnacion	Metagenomic Analysis of Microbial Communities in Air Vents	Department of Biological & Environmental Science

Number	Name	Title	Department
18	Kry, Jenny Kaitlin McNally	Stage of estrus and sleep loss influences attention and memory performance in the novel object recognition task	Biological and Environmental Sciences
19	Lin, Li Ting Marisa Carrasco	The Effect of Attachment Style and Social Rejection on Purchasing Preferences	Psychology
20	Lucente, Jacqueline	Isolation and Reactivity of Linalool	Chemistry
21	Mahar, Kaleigh Natasia Stewart Elaine Achama	Effects of New Highway Construction on Soil Microbial Communities	Biological and Environmental Sciences
22	Colleen Mair	Bias Related to Word Choice and Character Information	Psychology
23	Colleen Mair	The Impact of Texting and Social Media Habits on the Interpretation of Body Language	Psychology
24	Mascola, Michael Devin Haack	Identification of bacterial species and diversity on American dollar bills through analysis of prokaryotic 16S rRNA genes	Biological and Environmental Sciences
25	Matasavage, Kristy	The Effects of Stimulus Content and Body Positioning on Mental Rotation	Psychology
26	McFarland, Shannon Karen Velez Additional coauthors: Jeffrey Divino (University of Connecticut, Department of Ecology and Evolutionary Biology) Eric Schultz (University of Connecticut, Department of Ecology and Evolutionary Biology)	An examination of variance in the amino acid sequence of the secretory Na-Cl cotransporter (NCC) in two divergent Three-spined Stickleback (<i>Gasterosteus aculeatus</i>) populations	Biological and Environmental Sciences
27	McNally, Kaitlin	Characterization of a HAD Phosphatase from <i>M. tuberculosis</i>	Chemistry
28	Mortilla, Claire Jalen Miller Carlos Campoverde	The Sports Broadcasting Act of 1961: Was it a Cartel Leniency Program?	Economics
29	Murray, Ian	The Synthesis of a Transition State Analog for Application in Baeyer-Villiger Enzyme Mimics	Chemistry
30	Nag, Ishan	Progress Towards the Synthesis of Substituted Tetrahydrothiophenes	Chemistry
31	Nguyen, Hieu	Information embedding based on Pseudo Quantum Signal in M-band Wavelet Domain	Mathematics
32	Potocki, Alex	Shock Wave Calculations? No Problem! Essentially Non Oscillatory (ENO) Stencil Selection Procedures: Using Excel VBA to Study & Compare ENO Built With Various Basis Functions	Mathematics

Number	Name	Title	Department
33	Quinn, Connor Samantha Lipscomb Trevor Watson Danielle Riccio Zoe Taksic	Modeling the Effects of Dams on the Dispersal of <i>Podostemaceae</i> Seeds	Biological and Environmental Sciences
34	Rivieccio, James Payal Dudhedia Kathryn Flanagan Ashlyn Pacific Romney Tiru	Effects of Water Chemistry on Seed Biology in <i>Podostemaceae</i>	Biological and Environmental Sciences
35	Rosenblatt, Heather	Sleep loss impairs attention and memory performance in the novel object recognition task	Biological and Environmental Sciences
36	Rothbart, David Karina Escobar Katherine Atkin-Dahm	Analyzing Genetic Variation in <i>Protea repens</i> to reveal Evolutionary Patterns in the Cape Floristic Region	Biological and Environmental Sciences
37	Ryan, Tyler	Synthesis of 1,3-Oxathiolanes and 1,4-Oxathianes	Chemistry
38	Shoroye, Adebowale	Additive Manufacturing of Quadric Surfaces Using CAS and CAD Software	Mathematics
39	Sigillo, Mary Colin O'Brien	A comparative metagenomic analysis of bacteria found on chicken dermis using the 16S rRNA gene	Biological and Environmental Sciences
40	Sima, Juliann	Determination of Pharmaceutical Residues in Water Samples of the Housatonic River Valley Region By Solid-Phase Extraction (SPE) and Gas Chromatography-Mass Spectrometry (GC-MS)	Chemistry
41	Skiba, Daniel	Synthesis and Characterization of Single-Walled-Carbon-Nanotube Porphyrin Complexes	Chemistry
42	Ward, Roosevelt Juan-Pablo Cobos Andre Myton	United States Men's Soccer Competitiveness vs. Other Countries	Economics
43	Wooldridge, Tyler	An Analysis of Jupiter's Magnetosphere	Physics, Astronomy, and Meteorology

Faculty Participants

Research Mentors

Maya Aloni – Psychology
Galina Bakhtiarova - Spanish
Patrice Boily - Biological and Environmental Sciences
James Boyle - Physics, Astronomy, and Meteorology
David Burns – Mathematics
Stavros Christofi - Mathematics
Michael Coleman - Physics, Astronomy, and Meteorology
Neeta Connally - Biological and Environmental Sciences
Joshua Cordeira - Biological and Environmental Sciences
Bernard Gee – Psychology
Nicholas Greco – Chemistry
Rondall Khoo – Psychology
Rotua Lumbantobing - Economics
Yuan Mei-Ratliff - Chemistry
Michelle Monette - Biological and Environmental Sciences
Patricia O'Neill - Psychology
Jennifer Ort - Nursing
Thomas Philbrick - Biological and Environmental Sciences
Rachel Prunier - Biological and Environmental Sciences
Anne Roberts - Chemistry
Forest Robertson - Chemistry
Russell Selzer - Chemistry
Xiaodi Wang - Mathematics
Edwin Wong - Department of Biological & Environmental Science
Michael Zeilinhofer - Physics, Astronomy, and Meteorology

Poster Presentation Abstracts

1	<p>A Comparative Metagenomic Analysis of Candlewood Lake Sediment: The Rhizosphere of Eurasian Milfoil</p> <p><i>Sadia Alam and Edwin Rojas</i></p> <p><i>Faculty Mentor: Edwin Wong - Biological and Environmental Sciences</i></p> <p><i>Myriophyllum spicatum</i> (Eurasian water milfoil) is an invasive plant that has spread uncontrollably throughout Candlewood Lake. The project seeks to determine if the roots of milfoil have a symbiotic relationship with the bacteria that colonize the sediment in which these plants live, therefore, supporting widespread milfoil growth. This relationship will be ascertained by comparing these bacterial communities to those that colonize sediment where there is an absence of milfoil. Bacterial genomic DNA was extracted, and prokaryotic 16S rRNA genes were sequenced to determine the identity of bacteria present in both types of sediment.</p>
2	<p>Synthesis of Dimethylphenyl Uridines</p> <p><i>Michael Borges</i></p> <p><i>Faculty Mentor: Nicholas Greco - Chemistry</i></p> <p>Modification to the structure of deoxyribonucleic acid has been the focal point in altering its properties to observe enhanced benefits (medically, biochemically, etc.). Current modifications of native nucleosides focus on the sugar, backbone, or nucleobase. These structural modifications have been employed in order to probe duplex formation, protein activity, and requirements for enzymatic incorporation. Properties (biophysical, photophysical, etc.) of these nucleosides are challenging to predict, thereby creating a need for nucleosides to be synthesized and their properties investigated. The overall goal is to expand a library of modified nucleosides and the properties (biochemical, biophysical, etc.) which are available.</p>

<p>3</p>	<p>Surrealism in the "Informe sobre ciegos"</p> <p><i>Mauro Campoverde</i></p> <p><i>Faculty Mentor: Galina Bakhtiarova - Spanish</i></p> <p>Ernesto Sábato, an Argentinean writer of the 20th century is one of the most iconic figures of South America. Sábato was a novelist who achieved worldwide acclaim after publishing his second novel <i>Sobre Héroes y Tumbas</i>. Scholars have given various interpretations of its style and influences; yet none of them seem to have made a study between the socio-political situation of Argentina, at the time, and the novel. This essay will focus on the third chapter, the "Report on the Blind", and explain how its surrealist imagery was used to convey the socio-political ambiance of his time.</p>
<p>4</p>	<p>The Effect of Attachment Anxiety and Social Rejection on Preferences for Material and Experiential Purchases</p> <p><i>Marisa Carrasco and Jason Augustine</i></p> <p><i>Faculty Mentor: Maya Aloni - Psychology</i></p> <p>This study investigates whether attachment style influences the type of purchases people make in order to cope with rejection. Participants first completed a measure of attachment style. Participants were then asked to either write about a time they have felt intensely rejected, academic failure, or their walk to campus. A significant attachment anxiety by rejection interaction emerged. People low in attachment anxiety were more likely to mention material items following rejection. In contrast, there was a trend (although not significant) for people high in attachment anxiety in the rejection condition to prefer spending money on life experiences.</p>
<p>5</p>	<p>The Relationship between Priming Mindset and Change Blindness</p> <p><i>Amor-Lee Colombres</i></p> <p><i>Faculty Mentor: Patricia O'Neill - Psychology</i></p> <p>The purpose for this experiment is to investigate the relationship between priming an individual's mindset and change blindness. Change blindness refers to the phenomena that occurs when an individual is exposed to a change in a visual scene and fails to notice it. In culture there are two commonly referred to mindsets, collectivism and individualism. It is hypothesized that when primed with a collectivist mindset, people will focus attention on background information and when primed with an individualistic mindset, people will focus more on focal information.</p>

<p>6</p>	<p>Wage discrimination by race in the NBA</p> <p><i>Joseph Conway, Robert Nordma, and Tristan Cornelis</i></p> <p><i>Faculty Mentor: Rotua Lumbantobing - Economics</i></p> <p>Our project seeks to identify if racism exists in the National Basketball Association (NBA). The main component of racism we are looking for is wage discrimination. As a group, we wish to identify if players are paid more or less simply because of their race. In order to determine if wage discrimination by race exists we examined studies and data from the NBA recently and throughout history.</p>
<p>7</p>	<p>The Efficacy of Botanical-Based Repellent, Geraniol, at Repelling Blacklegged Ticks</p> <p><i>Payal Dudhedia</i></p> <p><i>Faculty Mentor: Neeta Connally - Biological and Environmental Sciences</i></p> <p>Blacklegged ticks transmit bacteria which cause Lyme disease in humans. DEET-based insect repellent is commonly recommended for preventing ticks bites. Several studies suggest DEET is effective and safe, yet there is a high public preference for botanically-based repellents. One botanical ingredient, geraniol, is commonly used in repellent products. Although product labels claim geraniol is effective for repelling ticks, there is little data regarding its efficacy. We used a fingertip bioassay to compare the effect of geraniol and DEET for repelling ticks. The results suggest that geraniol is as effective as 25% DEET for repelling blacklegged ticks after two hours post-application.</p>
<p>8</p>	<p>Can Money Buy Championships?: An Analysis of the Relationship between Wealth and Winning</p> <p><i>Stephanie Flerantin, Nicole Mair, and Graham Gaddis</i></p> <p><i>Faculty Mentor: Rotua Lumbantobing - Economics</i></p> <p>The purpose of this study is to examine the relationship between player salary and championship wins using regression analysis. Our hypothesis states that teams with the highest salaries are more likely to win the Super Bowl or World Series. This is based on the efficiency wage theory, which states that firms that pay workers a higher wage may experience higher productivity. We found that there is a weak relationship between salary and championship wins. Instead, team wins are based on a combination of factors, such as player salary, head coach salary, and number of regular season wins.</p>

<p>9</p>	<p>Study of the Formation and Evolution of Precipitation Induced Sea Surface Salinity Minima in the Tropical Pacific</p> <p><i>Ryan Gallagher</i></p> <p><i>Faculty Mentor: James Boyle - Physics, Astronomy, and Meteorology</i></p> <p>During heavy rain events in the tropics, salinity minimum zones develop in the near surface ocean. Freshwater input makes the upper layer less dense, and consequently confines downward mixing to shallower depths. Salinity adjusts via advective and diffusive mixing processes. This project investigates the upper ocean salinity response in the Northeastern Tropical Pacific Fresh Pool due to both processes using real observations and simple theoretical advective and diffusive mixing models.</p>
<p>10</p>	<p>Comparative Analysis of the Vaginal Microflora Between White and Minority Women</p> <p><i>Evelin Garcia, Jenny Kry, and Emily Slade</i></p> <p><i>Faculty Mentor: Edwin Wong - Biological and Environmental Sciences</i></p> <p>The vaginal microflora consists of various lactobacillus species which maintain an ideal environment in order to inhibit the growth of unwanted or harmful bacteria. Infections, such as bacterial vaginosis, develop if there is overgrowth of foreign bacteria. Various studies have been conducted to understand the uniqueness of the vaginal microflora, but very few have investigated the difference in the microbial communities between women of different races. In this study, genomic DNA was isolated from the microorganisms found on used tampon applicators. 16S rRNA genes were then amplified and sequenced to identify and compare the microorganisms found in the vaginal tract of white and minority women.</p>
<p>11</p>	<p>Floodplain Mechanics and the Active Transportation of Mercury in the Still River</p> <p><i>Christopher Gillotte</i></p> <p><i>Faculty Mentor: Michael Coleman - Physics, Astronomy, and Meteorology</i></p> <p>The Danbury area has been the subject of mercury pollution since the days of the hatting industry, but its effects continue to engage our environment today. Previous research has been conducted on the general transport of mercury from the Still River to major dammed areas of the Housatonic River and ultimately to Long Island Sound (Lerman-Sinkoff 2014). The current research will involve taking cores of soil on banks of the Still River, observing flow rates, and deducting a measurable amount of mercury flowing from active transport.</p>

<p>12</p>	<p>Volatile Materials in Martian Polar Craters</p> <p><i>Alexander Giuliano</i></p> <p><i>Faculty Mentor: Michael Zeilhofer - Physics, Astronomy, and Meteorology</i></p> <p>Glacial and fluvial morphologies have been identified at mid latitude regions on Mars. Investigating craters by the poles should show increased signs of glacial and fluvial activity. Features in craters can be separated into various categories that indicate whether or not they are glacial or fluvial in origin. In fact, prominent features of polar craters can be cross referenced with prominent features of mid latitude craters to determine if there is any correlation with volatile material and latitude. The ejecta blankets and preservational states for these craters were also investigated to determine the impact material and age of the craters.</p>
<p>13</p>	<p>Synthesis of Fluorescent Uridines</p> <p><i>Jessica Hensel</i></p> <p><i>Faculty Mentor: Nicholas Greco - Chemistry</i></p> <p>Since the discovery of the double helix, scientists have modified its structure to enhance its properties. Specifically, native nucleosides are essentially non-emissive, so this project will focus on enhancing their photophysical properties. Modified nucleosides with enhanced photophysical properties have been used to investigate duplex formation, small molecule binding, cellular uptake, etc. A family of modified nucleosides will be synthesized utilizing Suzuki coupling to 5-iodo-2'-deoxyuridine. Once successfully synthesized, and their identity confirmed through NMR analysis, the cellular uptake of each modified nucleoside will be investigated.</p>
<p>14</p>	<p>The Stress Response in Mice as a Result of Sex of Handler</p> <p><i>Jessica Hensel and Devin Haack</i></p> <p><i>Faculty Mentor: Patrice Boily - Biological and Environmental Sciences</i></p> <p>The laboratory mouse is frequently used as a model organism to provide insight into the stress response in humans. It has been shown that mice react differently based on the sex of the handler. We hypothesized that the stress response associated with a routine cage-changing procedure will differ according to the handler's sex. This was tested by comparing changes in activity level and body temperature in mice after undergoing a cage change performed by either male or female handlers. Contrary to published research, there wasn't a significant difference in the mice's stress response that resulted from the handler's sex.</p>

<p>15</p>	<p>Modeling Seed Dispersal of <i>Podostemaceae</i> by Birds</p> <p><i>Ben Iapaluccio, Vanele Dacosta, Nicole Lamparelli, and Lori Taylor</i></p> <p><i>Faculty Mentor: Thomas Philbrick - Biological and Environmental Sciences</i></p> <p><i>Podostemaceae</i> are a family of angiosperms that exhibit many narrowly endemic species. In angiosperms, seed dispersal can be a factor that limits the geographic range of species. The mucilaginous seeds of <i>Podostemaceae</i> are reported to be bird dispersed, although empirical evidence is lacking. We investigated relationships between mucilage and dispersal ability by sticking to birds and hypothesized that mucilage volume is positively correlated with dispersal ability. No correlation between mucilage volume and dispersal ability was found. Dispersal ability alone is not supported as a factor limiting the geographic ranges of species of <i>Podostemaceae</i>.</p>
<p>16</p>	<p>Comparative Metagenomic Analysis of Bacteria in Spruce Rhizosphere and Bulk Soil</p> <p><i>Terence Kelly and Connor Quinn</i></p> <p><i>Faculty Mentor: Edwin Wong - Biological and Environmental Sciences</i></p> <p>A healthy and functional soil microbiota is essential to the health of all terrestrial plant life. To investigate which bacteria are present in areas of plant growth, soil samples were taken from white spruce rhizospheres and compared to bulk soil samples in the surrounding area. Bacterial DNA samples were isolated from each soil sample, amplified and sequenced for their 16s rRNA genes. Differentiating between bulk and rhizosphere soil can help establish an understanding of the extremely complex microbiota that is involved in plant growth.</p>
<p>17</p>	<p>Metagenomic Analysis of Microbial Communities in Air Vents</p> <p><i>Charbel Khalil and Luisa Encarnacion</i></p> <p><i>Faculty Mentor: Edwin Wong - Department of Biological & Environmental Science</i></p> <p>Ventilation systems control the humidity and decrease the amount of pollutants entering a building but can facilitate the movement of microbes. An increase in humidity can introduce microorganisms that can grow on the vents while dust collects. Some microbes have been found in ventilation systems that are linked to opportunistic infections. This is of great concern in hospitals, where such pathogens can affect people with weakened immune systems. The purpose of this study is to examine the microbial communities found in the second and third floor air vents of the Science Building at Western Connecticut State University.</p>

<p>18</p>	<p>Stage of estrus and sleep loss influences attention and memory performance in the novel object recognition task</p> <p><i>Jenny Kry and Kaitlin McNally</i></p> <p><i>Faculty Mentor: Joshua Cordeira - Biological and Environmental Sciences</i></p> <p>To assess cognition in female mice with naturally cycling levels of estradiol, we measured attention and memory in the novel object recognition task during each stage of the estrous cycle. We found that attention and memory performance were impaired during metestrus and diestrus (when estradiol levels are low) as compared to proestrus and estrus (when estradiol levels are highest). Interestingly, sleep deprivation prior to testing also impaired cognitive performance of females in proestrus and estrus, without altering estrous cycle. These results suggest that estradiol and sleep are important yet independent factors regulating cognition.</p>
<p>19</p>	<p>The Effect of Attachment Style and Social Rejection on Purchasing Preferences</p> <p><i>Li Ting Lin and Marisa Carrasco</i></p> <p><i>Faculty Mentor: Maya Aloni - Psychology</i></p> <p>This study investigates whether attachment style influences the type of purchases people make in order to cope with rejection. Participants first completed a measure of attachment style and subsequently played a virtual ball tossing game (Williams, Cheung & Choi, 2000). Participants either receive the ball 33% of the time (acceptance condition), or twice at the beginning of the game and then did not receive the ball again (rejection condition). It is expected that participants high in attachment anxiety in the exclusion condition would be more likely to prefer spending money on life experiences than material things.</p>
<p>20</p>	<p>Isolation and Reactivity of Linalool</p> <p><i>Jacqueline Lucente</i></p> <p><i>Faculty Mentor: Nicholas Greco - Chemistry</i></p> <p>Fragrance chemistry involves the discovery of new fragrance ingredients and analysis of currently used fragrances. A number of these are extracted from natural sources. Linalool is a compound found in various plants including basil and coriander. This project will focus on isolation, purification and enantioselective conversion in order to obtain the different fragrance characteristics of each enantiomer.</p>

<p>21</p>	<p>Effects of New Highway Construction on Soil Microbial Communities</p> <p><i>Kaleigh Mahar, Natasia Stewart, and Elaine Achama</i></p> <p><i>Faculty Mentor: Edwin Wong - Biological and Environmental Sciences</i></p> <p>In Connecticut, over the past 30 years, paved roads have increased by 20%. The construction of these highways have a great impact on the soil's pH, organic composition, moisture, and even the microbial community. The construction of new roads can fragment and create a hard edge on the forest, greatly affecting the vegetation and organisms living there. In this study, soil from the Route 7 by-pass in New Milford, CT was analyzed to observe chemical and microbial changes throughout the forest.</p>
<p>22</p>	<p>Bias Related to Word Choice and Character Information</p> <p><i>Colleen Mair</i></p> <p><i>Faculty Mentor: Rondall Khoo - Psychology</i></p> <p>This study was conducted to analyze if a positive or negative bias can be imposed on participants and how the introduction of positive, negative, or neutral character evidence would influence a participant. Participants were asked to construct sentences using either positive or negative words. Subsequently, participants were given negative, positive, or neutral information about prior acts committed by a defendant. Lastly, participants were asked to evaluate the conduct of a defendant. The data indicated that there was no main effect of the variable type of words or interaction effect. There was a main effect for the variable prior act evidence.</p>
<p>23</p>	<p>The Impact of Texting and Social Media Habits on the Interpretation of Body Language</p> <p><i>Colleen Mair</i></p> <p><i>Faculty Mentor: Patricia O'Neill - Psychology</i></p> <p>Previous research suggests that the use of technology like texting and social media can interfere with face-to-face communication. This kind of interaction is essential to developing empathy and understanding nonverbal communication. The current study examines the possible effects of texting and social media use on a participant's ability to interpret body language. It is hypothesized that participants who text and/or use social media frequently will interpret the body language of a lecturer in a silent video clip differently than participants who text and/or use social media less frequently. The data will be analyzed using correlational analysis and one-way ANOVA.</p>

<p>24</p>	<p>Identification of bacterial species and diversity on American dollar bills through analysis of prokaryotic 16S rRNA genes</p> <p><i>Michael Mascola and Devin Haack</i></p> <p><i>Faculty Mentor: Edwin Wong - Biological and Environmental Sciences</i></p> <p>This study used metagenomic techniques to identify the various bacterial species and diversity on older and newer American cotton dollar bills in circulation. The bacterial species found on these bills could provide insight on the spread of pathogens and communicable diseases through the use of American currency. The circulated bills were collected from various high traffic locations including a grocery store, restaurant, liquor store, and gas station. Uncirculated bills were collected from a bank to serve as a control. Bacteria were isolated and their DNA was amplified using PCR and cloning techniques, whereupon the prokaryotic 16S rRNA genes were then sequenced and analyzed to identify the particular bacterial species present.</p>
<p>25</p>	<p>The Effects of Stimulus Content and Body Positioning on Mental Rotation</p> <p><i>Kristy Matasavage</i></p> <p><i>Faculty Mentor: Bernard Gee - Psychology</i></p> <p>Visuospatial skills help us to imagine how to arrange luggage or quickly recognize objects from different vantage points. The focus of this study was the interaction between stimulus type and body positioning on mental rotation. Participants performed the task faster and with higher accuracy during the presentation of hand stimuli compared to geometrical shapes. Subjects' hand position also affected performance. This study demonstrated the importance of sensorimotor integration in spatial reasoning. Results supported the idea that body positioning and stimulus familiarity influence our perception of the environment.</p>

<p>26</p>	<p>An examination of variance in the amino acid sequence of the Na-Cl cotransporter (NCC) in two divergent Three-spined Stickleback (<i>Gasterosteus aculeatus</i>) populations</p> <p><i>Shannon McFarland and Karen Velez</i></p> <p><i>Additional coauthors:</i></p> <p><i>Jeffrey Divino (University of Connecticut, Department of Ecology and Evolutionary Biology)</i></p> <p><i>Eric Schultz (University of Connecticut, Department of Ecology and Evolutionary Biology)</i></p> <p><i>Faculty Mentor: Michelle Monette - Biological and Environmental Sciences</i></p> <p>Three-spined stickleback (<i>Gasterosteus aculeatus</i>) have invaded multiple freshwater environments resulting in physiological adaptations for freshwater survival. We examined whether freshwater adaptation results from gene sequence alterations of the Na-Cl cotransporter (NCC), critical to osmoregulation. We isolated genomic DNA from gill tissue and compared the gene sequence of the NCC protein-coding region in divergent landlocked and marine stickleback populations. In exon 10, the amino acids at position 413 and 415 were different for landlocked and marine populations. This NCC protein region is involved in membrane trafficking, indicating a possible evolutionary adaptation for freshwater survival.</p>
<p>27</p>	<p>Characterization of a HAD Phosphatase from <i>M. tuberculosis</i></p> <p><i>Kaitlin McNally</i></p> <p><i>Faculty Mentor: Anne Roberts - Chemistry</i></p> <p>Tuberculosis is a highly contagious disease which typically affects the lungs. Tuberculosis kills more people every year than HIV. Antibiotic resistant strains continue to emerge. Because of this, better characterization of the causative agent, Mycobacterium tuberculosis, is needed, including its genes of unknown function. Our work is an investigation of a Haloacid Dehalogenase superfamily enzyme from the virulent H37Rv strain. The product of gene Rv3376 was identified as a phosphatase and shown to contribute to the survivability of <i>M. tuberculosis</i> in macrophages, its primary in-host dwelling. We aimed to optimize purification methods and identify a suitable substrate for this phosphatase.</p>

<p>28</p>	<p>The Sports Broadcasting Act of 1961: Was it a Cartel Leniency Program?</p> <p><i>Claire Mortilla, Jalen Miller, and Carlos Campoverde</i></p> <p><i>Faculty Mentor: Rotua Lumbantobing - Economics</i></p> <p>We seek to examine the validity of the Sports Broadcasting Act of 1961, and to determine if it is indeed a thinly masked cartel leniency program. In addition, we will try to discover whether the sports industry could/should operate as a free market enterprise and ask why or why not. What is the role of government, specifically what part of the government is most involved with the sports industry? As this is a broad subject, we will limit our examination to the economic impact and financial aspects of the above mentioned concerns.</p>
<p>29</p>	<p>The Synthesis of a Transition State Analog for Application in Baeyer-Villiger Enzyme Mimics</p> <p><i>Ian Murray</i></p> <p><i>Faculty Mentor: Forest Robertson - Chemistry</i></p> <p>Recent reports have demonstrated that molecularly imprinted polymers (MIPs) can be utilized as enzyme mimics to catalyze representative organic reactions. During this project, a synthetic method was developed to access a suitable transition state analog (TSA) for eventual application in the synthesis of a Baeyer-Villiger enzyme mimic. Progress towards this goal is evidenced by the synthesis of 2,2,6,6-tetrafluorocyclohexanone, which is the template molecule that will be used to form the requisite TSA. In an effort to access the TSA, 2,2,6,6-tetrafluorocyclohexanone will be treated with various functional monomers.</p>
<p>30</p>	<p>Progress Towards the Synthesis of Substituted Tetrahydrothiophenes</p> <p><i>Ishan Nag</i></p> <p><i>Faculty Mentor: Forest Robertston - Chemistry</i></p> <p>The tetrahydrothiophene moiety has been implicated in a variety of biologically active molecules. Among other properties, tetrahydrothiophenes have been shown to possess hypocholesterolemic, anti-viral, anti-cancer, and anti-inflammatory properties. We have explored several methods for a facile synthesis of 2-substituted tetrahydrothiophenes and 1,3-dihydrobenzo[c]thiophenes starting from an alkyl halide and a phosphorothiophate ester, via generation of a Grignard or organolithium reagent, as well as a synthesis via generation of a Weinreb amide common intermediate. These methodologies are currently being applied to generate a library of novel compounds whose biological activity will be probed.</p>

<p>31</p>	<p>Information embedding based on Pseudo Quantum Signal in M-band Wavelet Domain</p> <p><i>Hieu Nguyen</i></p> <p><i>Faculty Mentor: Xiaodi Wang - Mathematics</i></p> <p>Information privacy is a big concern in our modern world. Many companies and governments are developing different mathematical algorithms to protect their private information. Color barcoding is a promising new technology. These barcodes contain 3 or more color channels, and can hold a massive amount of information. Due to the recent developments in wavelet transform and pseudo-quantum signal, we are proposing that a new scheme of mathematical steganography be incorporated into the color barcode to help protect private information on the internet.</p>
<p>32</p>	<p>Shock Wave Calculations? No Problem! Essentially Non Oscillatory (ENO) Stencil Selection Procedures: Using Excel VBA to Study & Compare ENO Built With Various Basis Functions</p> <p><i>Alex Potocki</i></p> <p><i>Faculty Mentor: Stavros Christofi - Mathematics</i></p> <p>Essentially Non Oscillatory (ENO) are numerical techniques used in the computation of discontinuous solutions (shocks) of hyperbolic partial differential equations (PDEs) that play a crucial role in diverse applications. Their design is reduced to a problem of interpolation, where discontinuities are captured with an ENO stencil selection process, which locally interpolates over the smoothest parts of the function, reducing the effects of erroneous spurious oscillations around discontinuities. We developed an MS Excel VBA tool that demonstrates the polynomial ENO (POLENO) and trigonometric ENO (TRIGENO) schemes, using it to obtain numerical results and comparison tables/graphs in terms of error and accuracy.</p>

<p>33</p>	<p>Modeling the Effects of Dams on the Dispersal of <i>Podostemaceae</i> Seeds</p> <p><i>Connor Quinn, Samantha Lipscomb, Trevor Watson, Danielle Riccio, and Zoe Taksic</i></p> <p><i>Faculty Mentor: Thomas Philbrick - Biological and Environmental Sciences</i></p> <p>Large dams impact the distribution of riverine biota by disrupting natural flow rates. Species of the angiosperm family <i>Podostemaceae</i>, many of which are of conservation concern, are restricted to rivers, specifically rapids and waterfalls. Seed dispersal via water is crucial for maintaining populations of these plants. We assembled two artificial rivers to test the hypothesis that rate of water flow affects seed dispersal. Our laboratory based studies support the prediction that large dams, because of their influence on water flow, have an impact on endemic species distributions and biodiversity in riverine environments.</p>
<p>34</p>	<p>Effects of Water Chemistry on Seed Biology in <i>Podostemaceae</i></p> <p><i>James Riviuccio, Payal Dudhedia, Kathryn Flanagan, Ashlyn Pacific, and Romney Tiru</i></p> <p><i>Faculty Mentor: Thomas Philbrick - Biological and Environmental Sciences</i></p> <p>Amazonian rivers are characterized by their chemical composition, with distinctions between the more acidic "black" waters, and the less acidic "white" waters. Numerous species of <i>Podostemaceae</i> are restricted to these rivers, with some species occurring in the rivers of only one water type. Species distribution is potentially limited by the seedling stage which is especially sensitive to environmental conditions. We hypothesized that water chemistry affects seed biology, and if so, could influence species distribution. Lab-based studies revealed significant differences in seed germination and adherence depending on pH. Therefore, pH may be an important factor influencing species distribution of <i>Podostemaceae</i>.</p>

<p>35</p>	<p>Sleep loss impairs attention and memory performance in the novel object recognition task</p> <p><i>Heather Rosenblatt</i></p> <p><i>Faculty Mentor: Joshua Cordeira - Biological and Environmental Sciences</i></p> <p>Sleep is essential for healthy cognitive performance but the underlying brain mechanisms sensitive to sleep loss are unknown. We first investigated whether prior sleep loss impaired object-based attention and memory in mice using the novel object recognition task. Our results show that both object-based attention and memory performance were compromised by sleep deprivation before the novel object recognition task. We also used optogenetics to selectively inhibit activity of basal forebrain GABA neurons to assess whether cognition was similarly impaired. These neurons may be necessary for attention and memory processes sensitive to sleep loss.</p>
<p>36</p>	<p>Analyzing Genetic Variation in <i>Protea repens</i> to reveal Evolutionary Patterns in the Cape Floristic Region</p> <p><i>David Rothbart, Karina Escobar, and Katherine Atkin-Dahm</i></p> <p><i>Faculty Mentor: Rachel Prunier - Biological and Environmental Sciences</i></p> <p>The Cape Floristic Region (CFR) of South Africa is characterized by narrowly endemic plant species. However, the evolutionary processes, such as isolation and gene flow, that gave rise to this diversity are understudied. We investigated the anomalous <i>Protea repens</i>, which displays an uncommonly widespread distribution across the CFR, to quantify genetic variation within populations and estimate gene flow between them. By extracting DNA from 20 individuals from each of three populations of <i>P. repens</i> and measuring diversity at nine microsatellite loci, we will determine the roles isolation and gene flow play in the region's diversification.</p>

<p>37</p>	<p>Synthesis of 1,3-Oxathiolanes and 1,4-Oxathianes</p> <p><i>Tyler Ryan</i></p> <p><i>Faculty Mentor: Forest Robertson - Chemistry</i></p> <p>The development of new C-S bond-forming technologies is of significant importance. The 1,3-oxathiolane moiety is of interest as it is present in biologically active molecules such as Lamivudine, an antiretroviral medication used in the treatment of HIV/AIDS. Similarly, the 1,4-oxathiane moiety is found in a range of biologically active molecules, including Tagetoxin, which has recently been shown to decrease the rate of nucleotide addition during RNA synthesis. This project describes the syntheses of O,O-diethyl S-((2-(methoxy(methyl)amino)-2-oxoethoxy)methyl) phosphorothioate and O,O-diethyl S-(2-(2-(methoxy(methyl)amino)-2-oxoethoxy)ethyl) phosphorothioate, which will be utilized as common intermediates for the preparation of libraries of 1,3-oxathiolanes and 1,4-oxathianes.</p>
<p>38</p>	<p>Additive Manufacturing of Quadric Surfaces Using CAS and CAD Software</p> <p><i>Adebowale Shoroye</i></p> <p><i>Faculty Mentor: David Burns - Mathematics</i></p> <p>3D printing is a rapidly growing practice with applications in various disciplines. The process of 3D printing involves using a computer to model a structure, then "slicing" the model for the printer to understand. A common technique of 3D printing is additive manufacturing, which involves slicing the model into horizontal cross sections and printing the model in layers. We utilized 3D printing to create a physical model of a wire frame graph derived from the quadric surface $z=x^2-y^2$. We compared Computer Algebra System (CAS) and Computer Aided Design (CAD) software in their ability to model and print our quadric surface.</p>

<p>39</p>	<p>A comparative metagenomic analysis of bacteria found on chicken dermis using the 16S rRNA gene</p> <p><i>Mary Sigillo and Colin O'Brien</i></p> <p><i>Faculty Mentor: Edwin Wong - Biological and Environmental Sciences</i></p> <p>The purpose of this study is to determine the diversity of bacteria present on the dermis of organic, store brand, and name brand chicken. Bacterial DNA was isolated from each of three sample categories of chicken. Then the DNA was amplified through PCR, sequenced, and analyzed. This study will inform the general public of the relative presence of pathogenic bacteria associated with each method of raising and packaging chicken for consumption.</p>
<p>40</p>	<p>Determination of Pharmaceutical Residues in Water Samples of the Housatonic River Valley Region By Solid-Phase Extraction (SPE) and Gas Chromatography-Mass Spectrometry (GC-MS)</p> <p><i>Juliann Sima</i></p> <p><i>Faculty Mentor: Yuan Mei-Ratliff - Chemistry</i></p> <p>It has been seen that some pharmaceuticals are not completely metabolized by the human body, and therefore are being excreted into our wastewater, water bodies (rivers, lakes, etc.), and possibly found into our drinking water. This study examined six pharmaceutical drugs (ibuprofen, naproxen, triclosan, ketoprofen, gemfibrozil, and acetaminophen) by gas chromatography-mass spectrometry (GC-MS). In order to detect these polar drugs, a derivatizing method was employed. Once detection was made, reaction temperature and amount of reagents used were optimized, and recovery rates were determined. Analysis of these drugs in local water sources from the Housatonic River Valley Region (CT) is reported.</p>

<p>41</p>	<p>Synthesis and Characterization of Single-Walled-Carbon-Nanotube Porphyrin Complexes</p> <p><i>Daniel Skiba</i></p> <p><i>Faculty Mentor: Russell Selzer - Chemistry</i></p> <p>The effect of single-walled carbon nanotube (SWCNT) binding on porphyrin spectral properties will be studied. SWCNT's have been shown to quench the excited state of bound porphyrin complexes and improve electron transfer. Synthesis of 5-p-hydroxyphenyl-10,15,20-triphenylporphyrin will be carried out and other porphyrin complexes will be used for linkage. Non-covalent binding to the SWCNT's through pi-pi interaction will be carried out with Tetraphenylporphyrin. The 5-p-hydroxyphenyl-10,15,20-triphenylporphyrin will be employed for covalent linkage to thionyl chloride modified SWCNT's. Sodium Cholate will be used to disperse SWCNT's into water. A porphyrin will be added to this solution to form a complex between the SWCNT's, sodium cholate, and its spectral properties examined. The characterization of materials and products will be analyzed using UV/Vis spectroscopy, FT-IR spectroscopy, fluorescence emission spectroscopy (FES), and flash photolysis (FP). FP and FES will be employed to measure the quenching effect SWCNT's have on the rate of decay of the connected porphyrin's excited state.</p>
<p>42</p>	<p>United States Men's Soccer Competitiveness vs. Other Countries</p> <p><i>Roosevelt Ward, Juan-Pablo Cobos, and Andre Myton</i></p> <p><i>Faculty Mentor: Rotua Lumbantobing - Economics</i></p> <p>Our study looks at the competitiveness of the US Men's National Soccer Team over the past 20 years. Compared to other nations, the game of soccer is still relatively new to the United States. Other national teams that are considered competitive have many more international matches played than the US team. To make up for this lack of team experience we wanted to investigate the experience of the individual players. This can lead to a better understanding of what kind of players the US needs to be competitive with other national teams. The economic model we used was a regression analysis.</p>

43	<p>An Analysis of Jupiter's Magnetosphere</p> <p><i>Tyler Wooldridge</i></p> <p><i>Faculty Mentor: Michael Zeilhofer - Physics, Astronomy, and Meteorology</i></p> <p>A dynamic magnetic field is crucial to the development and protection of a planet. The development of such a magnetic field will depend on the presence of a magnetohydrodynamic (MHD) dynamo effect at a planet's core. Understanding these internal processes can help determine other planetary attributes, as well as an intrinsic magnetic field. Numerical and analytical methods are used to model and calculate the Jovian magnetic field. Specifically, computing software (MATLAB) is used to generate a three-dimensional visualization of the Jovian magnetosphere based on various model parameters, solar wind effects, and contributions from the Io plasma torus.</p>
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Western Research Day is possible because of contributions of students, faculty, staff and administrators. It is sponsored by the Provost's Office at Western Connecticut State University.

Appreciation and thanks to people who made this event possible

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