

The Sixth Annual
Ranger Research Day

Friday, April 6, 2012
Student Center Ballroom ~ Alva campus



**LIST OF
ABSTRACTS**

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Northwestern Oklahoma State University
 Alva, Oklahoma ~ Friday, April 6, 2012
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ABSTRACTS

Arts & Music

1.02 Music

1.02.01, “Mozart: Opera” [Conference Paper]

Jamie Brien (Dr. Sarah Chan, Sponsor)

This research looks at the beginnings of opera and the influence of Wolfgang Amadeus Mozart with a heavy emphasis on *Don Giovanni* (1787) and *Le nozze di Figaro* (1786), both canonized works by Mozart. Research relies heavily upon the complete scores of both works and supplemental research by Julian Rushton, who came out with an informational study on *Don Giovanni*. Along with the supplemental research that delved deeper within the technicality of the works, I formed research upon the performance of Oklahoma University’s presentation of *Don Giovanni* that I attended. In short, this essay explores Mozart’s influence upon opera as a genre and the musical technicalities of these two works specifically.

1.02.02, “Igor Stravinsky” [Conference Paper]

Cory Kerr (Dr. Sarah Chan, Sponsor)

The life of Russian composer Igor Stravinsky (1992–1971) will be discussed with especial emphasis placed on his musical accomplishments through examination of two works.

Education

3.06 Psychology

3.06.01, “Can I Get Into Your Comfort Zone?” [Poster]

Tim Jewell & Stephanie Metcalfe (Dr. Sherril Stone, Sponsor)

This project involved observing the reactions of people whenever their comfort zone was invaded. The study was conducted at numerous stores, basketball games, and on campus. None of the participants were singled out, and it included males, females, adolescents, and

adults. The reaction of people was unknowingly observed. The results indicated that most people were somewhat neutral, that is they never became offended or confrontational. However, at a basketball game, differences were observed. The experimenter sat on the opposing team's side on their senior night. She was asked to leave. The other experimenter was never confronted, but it is hypothesized this was due to his physical size, which could have been intimidating to fans. Future studies should observe a variety of participants. For instance, those who are quiet or hyperactive, conservative or outlandish and ranging from 18–100 years could be observed.

3.06.02, “Drinking Habits During the Work Week” [Poster]

Sean Ekberg, Brent Clicker, & Tom Barry (Dr. Sherril Stone, Sponsor)

The purpose of this study was to ascertain how much, and to what degree, people consumed alcoholic beverages per week and what days were the most popular. The researchers realized that traveling to every place that served alcohol would be impossible; therefore, the sites were narrowed to include three concept restaurants: Applebee's, Buffalo Wild Wings, and Chilis. It is widely known that people tend to consume greater amounts of alcohol on Friday and Saturday evenings. In light of this common conception, the researchers were curious what the drinking habits were for people on the days from Monday through Thursday. In order to obtain data, these three restaurants were visited on eight separate occasions: twice on two separate Mondays, twice on two separate Tuesdays, etc. This was an attempt to lend more validity to the findings.

3.06.03, “Technology and Social Media Contribute to the Increase of Personal Space” [Poster]

**Kimberly Beegle, Mindy Cordell, & Misty Stroud
(Dr. Sherril Stone, Sponsor)**

Personal space was consistently present in all of the settings that were observed. However, there were variations of distances between groups. Due to the accessibility to social media and current technology, an individual's preference of personal space was directly affected. Age and gender were also determining factors. Income level and social status did not have any effect on the personal space between individuals. Observations were done during various times, dates, and scenarios. It is important to understand why and how individuals perceive and implement personal space around them. The age of the individual, combined with the level of accessibility to technological communication, reveals that face to face social interactions have become limited. These results have a significant impact on how personal interactions will ultimately disappear from society, and personal space will be at a maximum.

3.06.04, “The Effects of Participating in Visual Arts on the Cognitive and Social Development of Children” [Poster]

Allison Reinart (Dr. Nancy Knous, Sponsor)

Investigating the relationship between art and the brain is a relatively new research topic; however, many researchers have already branched out to find this connection. The study in this paper was influenced primarily by the previous research findings and the decision of many schools to remove art programs from their curriculum. The study was aimed at discovering a relationship between participation in creating visual art and cognitive and social development. The participants were sixteen third grade students from an elementary school

in northwestern Oklahoma, all of whom completed the required consent/assent forms. Each participant was assigned an ID by the teacher to keep the personal information anonymous. The study consisted of three stages: Pre-Intervention Stage, Intervention Stage, and Post-Intervention Stage. The Pre- and Post-Intervention stages involved the completion of the Rosenberg Self-Esteem Scale and a Student Assessment Survey. Additionally, the teacher of the third grade class completed a Literacy Study-Skills Observational Checklist for each student and provided the grades for each participant. The Intervention Stage included four weeks of twice-weekly art projects at the elementary school in different areas of art. Preliminary analysis revealed no significant results; however, this study could serve as a pilot study for a future study with a longer time period and more participants.

3.06.05, “Pet and Stress” [Poster]

Danielle Hubble (Dr. Nancy Knous, Sponsor)

Owning a pet has been shown to affect people in a variety of settings. Having a pet may reduce blood pressure and help college freshmen adjust to a changing environment (Somervill, Kruglikova, Robertson, Hanson, & Mac Lin, 2008). Research results show that freshmen college students benefit from pet therapy (Adamle, 2009). This research investigates the correlation between pets and stress by considering the role pets play in the lives of the people around them, focusing specifically on college students. College students deal with an incredible amount of stress. Can having a pet of some type be associated with lower stress? Participants in the study were fifty of Northwestern Oklahoma State University students and professors. Correlational analysis should indicate a relationship between having a pet and lower stress.

Liberal Arts

4.02 English

4.02.01, “Challenging Gender Roles: *Wuthering Heights*”

[Conference Paper]

Alexis Hulvey (Dr. Kathryn Lane, Sponsor)

The characters in *Wuthering Heights* defy typical gender roles of the 1800s. Most of the characters in this novel stray from parts of the typically accepted roles and, at other times, embrace the typical gender role and exaggerate it. Women of this time were usually concerned with having a comfortable home life, obeying their husbands, and caring for their children. *Wuthering Heights*, however, uses many different female characters to challenge this stereotype. The older Catherine has the role of the typical female in the early 1800s by marrying for profit and denying her true love. The younger Catherine steps out of the accepted role of women during this time by challenging the patriarchal system that is established and widely accepted during the early 1800s. Isabella Linton breaks free of the patriarchal system to save herself and her child. All of these characters at some point during the novel challenge the typically accepted gender roles of the time. Subsequently, this paper examines the different gender roles that Emily Brontë utilized to express the characters and their differences and the ways that she used her characters to challenge the gender roles that dominated the early 1800s.

4.02.02, “The Role of the Absent Mother in Jane Austen’s *Emma*”

[Conference Paper]

Morgan Plummer (Dr. Kathryn Lane, Sponsor)

In Jane Austen’s novel of manners *Emma*, the eponymous main character is motherless and relies upon the guidance of a governess for her home training. This motherless theme is a common phenomenon in Austen’s work as well as in British literature of the period. The class system was quickly changing because of the Industrial Revolution, and, as a result, social roles were suddenly not as clearly defined as previous. Jane Austen, along with other writers of this period, utilized the role of the absent mother to symbolize the new absence of clearly delineated social roles in English society. The main character of *Emma* was guided by her governess, Miss Taylor, who served as a substitute for her mother until she was whisked away in marriage. Miss Taylor represents the newly emerging social order as she marries a man above her class. *Emma* was guided by Miss Taylor (the new social order), but due to her role as a substitute mother, Miss Taylor was forced eventually to leave *Emma*. This correlates with the new social system’s lack of fortitude as it was not ingrained in the social structure like the traditional roles of the previous class system that correlates with *Emma*’s dead mother. *Emma* was eventually left to guide herself and decide on her own what the best method of behavior should be.

4.02.03, “Taking ‘Man’ Out of Woman” [Conference Paper]

Robin Cline (Dr. Kathryn Lane, Sponsor)

What would you do if your rights were far less equal than others’ in today’s society? Would you take a stand for liberation or just continue living the same life until someone else made a difference? Women were overlooked in history and were not seen as independent individuals who could influence society. Women were passive and mainly treated as property to their husbands. Feminist movements and women writers strove to break the mold of these societal expectations. Anna Letitia Barbauld uses her poetry to give insight to women’s roles in society. Barbauld focuses on women and how important they are to life and society in three of her poems: “The Rights of Woman,” “To a Little Invisible Being Who Is Expected Soon to Become Visible,” and “Washing-Day.” In these works, Barbauld discusses women and their unacknowledged contributions to society. Her references to the idea of women’s liberation may be subtle in the latter two poems, but “The Rights of Woman” emphasizes this theme throughout. This paper will also address Mary Wollstonecraft’s *A Vindication of the Rights of Woman* to view Barbauld’s reaction to her work. By closely analyzing these three poems and utilizing the scholarly works of others, I will draw out the references that emphasize Barbauld’s hidden or covert theme of liberating women in society.

4.02.04, “The Humanity of Wordsworth” [Conference Paper]

Kristi Hunter (Dr. Kathryn Lane, Sponsor)

William Wordsworth was a man of heart and depth. His contributions to literature were those of humanity and nature. His goal was to bring the lower classes to those who read his work. This evidence is expressed throughout his writing. An example of this occurs in “September 1st, 1802.” He wanted to show the humanity of those with less. Wordsworth was able to relate through words the thoughts and feelings of others as well as his own passion.

Wordsworth accomplished much that is still read and enjoyed today. His contemporaries thought he should have never focused on poverty and instead should have only depicted beauty. They felt there was too much ordinary in the way he expresses his thoughts on paper. “The Solitary Reaper” is just one of his works that is proof that this is not true. This paper will examine that Wordsworth was able to combine his beliefs to become one of the most successful poets in history. William Wordsworth displayed a paradox of beauty and poverty through the world of literature.

4.08 *Political Science*

4.08.01, “The Mind of a Leader” [Poster]

Danielle Hubble (Dr. Aaron Mason, Sponsor)

This research proposal involves the exploration of the social-psychology of a political figure and his/her potential for leadership. This proposal, guided by the Platonic assumption of The Republic, challenges the proposition that all individuals are equipped with the ability to lead. This assumption runs counter to the attitudes of many contemporary Americans. The research attempts to recognize the key factors of a person’s social-psychology and his/her potential to become a successful political figure in a position of leadership. Specific political figures will be examined to determine what social and psychological attributes are required to be a successful leader. The degree of communication and a person’s charisma can be established through this research as well. This proposal will utilize history, theoretical foundations, and such other forms of related research as personality traits, self-perception, credentials, relationships, political party affiliation, leadership style, religion, and crisis events. The participants to be involved will consist of members of the Oklahoma Legislature. Seventy-nine members of the legislature will be asked to answer a survey questionnaire. From this pool of individuals, ten will be asked to participate in an interview. Both men and women in the House of Representatives and the Senate will be requested to be involved. All ethical considerations will be taken into consideration with this study.

Math & Science

6.01 *Biology*

6.01.01, “Electroencephalogram Changes Dependent on Sleep Deprivation” [Poster]

Clay Reed (Dr. Cynthia Pfeifer-Hill, Sponsor)

It is presently common in society for individuals to suffer from the lack of sleep on a regular basis. Because of this increasingly common problem, this research examines the impact of alterations in brain waves (recorded via electroencephalograms) dependent on sleep deprivation. By recording electroencephalograms from the test subjects while they perform multiple-choice exams consisting of arithmetic and reasoning questions, the variations in brain waves and the answering efficiency of the test subjects revealed the effects of sleep deprivation. While many individuals are sleep-deprived on a daily basis, the results of this research demonstrated alterations in brain waves with sleep deprivation. This study also

helps signify the importance of sleep in the proficiency of individuals while performing mental tasks throughout each day. Thus, this exploratory investigation indicates the apparent importance of sleep on a regular basis.

6.01.02, “Electrooculogram (EOG) Comparative Analysis Between Diabetic and Non-Diabetic Readers” [Poster]

Tiffany George (Dr. Cynthia Pfeifer-Hill, Sponsor)

Diabetics often experience eye problems, such as diabetic retinopathy. Diabetic retinopathy is the leading cause of blindness for Americans. Severe diabetes for a prolonged period of time increases the risk of developing diabetic retinopathy. An electrooculogram was used to determine whether the recordings would differ in a diabetic and a non-diabetic. This method may potentially be used to detect damage from diabetic retinopathy. The results of the experiment were inconclusive due to variability of the test subjects and sample size. In future experiments, variability in test subjects and a larger sample size could potentially show different trends in slope and the number of saccades may become more apparent. An electrooculogram recording may still potentially be a good, non-invasive method to screen for damage from diabetic retinopathy.

6.02 Chemistry

6.02.01, “Improved Synthesis of 6-Formylpterin, An Essential Precursor of New Dihydrofolate Reductase Substrate Analogs” [Poster]

Cornelia Mihai, Cortney Florence, Joe Martin, & Wade Schwerdtfeger (Dr. Cornelia Mihai, Sponsor)

DHFR is one of the most important enzymes involved in DNA biosynthesis and hence an important clinical target. Its role in DNA synthesis is to convert the substrate dihydrofolate (DHF) to tetrahydrofolate (THF) *via* a hydride transfer reaction. DHF must be constantly reduced to THF by DHFR for the cell to maintain THF-dependent functions, such as cell division. The objective of the proposed research project is to synthesize 6-formylpterin, an essential precursor for new dihydrofolate reductase (DHFR) substrate analogs. The new dihydrofolate (DHF) analogs will be used to develop a better understanding of the mechanism of hydride transfer catalyzed by DHFR and they might be of unique medical importance.

6.02.02, “Introductory Bioorganic Study of Firefly Luciferase—An Enzyme to Drive Bioluminescence” [Poster]

Cornelia Mihai, Chase Ratzlaff, & Wyatt Rice (Dr. Cornelia Mihai, Sponsor)

The emission of light in certain organisms is known as bioluminescence. Bioluminescence is a process to produce and emit light by an organism as the result of a chemical reaction which converts chemical energy to light energy. The bioluminescence produced by firefly (*Photinus pyralis*) is the most researched and the first elucidated. Some of the current applications of bioluminescence include: detecting bacteria in food products, signaling pathogens in crops,

tracking infections, monitoring the growth of tumors using Bioluminescent Imaging (BLI), and many others.

The objective of the proposed research project is to initiate a comprehensive bioorganic study of Firefly luciferase which will consist of: extraction of luciferase from dry firefly lanterns, purification and analysis of luciferase. This introductory study will be used to develop new laboratory experiments which will be incorporated in the Biochemistry course currently taught in the Department of Natural Sciences at NWOSU.

6.02.03, “Study of the Distribution and Quantity of Iodide in the Brine Waters of Northwestern Oklahoma” [Poster]

Eric Pribil (Dr. Jason Wickham, Sponsor)

In the late 1970s, it was discovered that the brine waters of northwestern Oklahoma contain significant amounts of Iodide (above 60 ppm). However, the exact amounts and distributions of Iodide throughout this brine water formation were unknown. Currently, the majority of the world's supply of Iodine comes from mining Iodate minerals in Chile (~ 65%), brine water aquifers in NW Oklahoma (~ 5%) and Japan (~ 25%), and seaweed extraction. With the growing need for Iodine compounds in the medical and agricultural fields the demand for Iodine is higher than ever. One example of this is the development of a new environmentally safe biodegradable fumigant (methyl iodide) developed by Arysta LifeScience Technology, which is currently poised to replace the non-biodegradable methyl bromide based fumigants. Thus, Arysta LifeScience Technology has recruited the aid of Northwestern Oklahoma State University to quantify the Iodide concentration and distribution throughout the brine aquifer as well as to determine the longevity of these iodide concentrations. Currently, this has resulted in the discovery of five new sites within the aquifer that contain concentrations above 300 ppm and show that the iodide levels are currently steady within about an 8 ppm fluctuation.

6.04 Forensic Science

6.04.01, “Forensic Anthropology” [Poster]

Carmen Sander (Dr. Cynthia Pfeifer-Hill, Sponsor)

Forensic anthropology techniques are used to assess remains of bodies, mostly determining identity, discovering evidence of trauma, and analyzing diseased corpses. The objective of this study was to perform a complete forensic analysis of 4 human skulls owned by Northwestern Oklahoma State University's Department of Natural Science. The identification of these skulls was entirely unknown previous to this study. Knowledge of the race, sex, and age of these skulls will aid in other research projects conducted by Northwestern's Department of Natural Science in the future. Raw measurements of the skulls were taken in using dial calipers; other data was collected by visual observation, comparison, and reasoning. Applying basic forensic anthropology techniques, the data found was used to determine the most likely race, sex, and approximate age of each skull. One skull was found to be an African female who was approximately in her late 20s–30s at death. Another skull was determined to be an elderly Asian male. The other two skulls most likely belonged to Europeans, one being an elderly female and the other a young male.

6.06 *Nursing*

6.06.01, “Managing Stress with Bio-Touch: A Non-Invasive Tool for Achieving Balance” [Conference Paper]

Senior Nursing Students (Dr. Carole McKenzie, Sponsor)

Achieving balance in work and life requires multiple approaches to managing stress. In addition, given that stress is the underlying causative factor in the development of illness, the management of both life and work stressors becomes an important component to managing health and patient/family well-being.

Senior nursing students at Northwestern Oklahoma State University developed and completed a research study utilizing a complementary touch therapy, entitled Bio-Touch, to assess the effects on stress and other related factors. It is a butterfly light touch applied to specific points on the human body. Previous research has suggested that Bio-Touch decreases individual stress, pain, restlessness; improves vital signs; and increases immune response and feeling cared for. This therapy is easy to do and can be taught to anyone—a health care professional is not required—and there are no adverse side effects.

A convenience sample was utilized at the university, which included students, staff, faculty, and community members. There were 248 participants in the study fairly evenly matched in gender and with an age range of 19–78. Pain, restlessness, stress, the feeling of being cared for, and relaxation were assessed via questionnaire before and after the receipt of Bio-Touch. The levels of pain, restlessness, and stress were significantly decreased, and the levels of being cared for and relaxation were significantly increased after Bio-touch.

The utilization of an inexpensive stress management tool for patients/families is invaluable to managing health and to improving quality of life and balance for all. This research can be easily replicated and utilized in any setting. In addition, the senior nursing research students achieved an interest in and respect for not only the complementary therapy but also for research and have committed to presenting this research and utilizing this strategy in their clinical practice.

6.07 *Physics & Engineering*

6.07.01, “Floaters of the Eye” [Poster]

Tiffany George (Dr. Steven Maier, Sponsor)

Floaters are dark spots, lines, or particles that people notice moving around in their field of vision. Floaters are caused by normal degenerative changes in the vitreous or as a result of a retinal tear. Currently the only known way to treat a retinal tear is through surgery. This experiment investigates a method for analysis and explores an inexpensive way to model this phenomenon in a tangible way. Using art editor software, the difference of a distorted image and an image that was not distorted were taken using pixel subtraction. While an image was obtained, the results were not clear enough to analyze

the data quantitatively. The results of the study were inconclusive because of movement between pictures. In future experiments, camera movement would need to be reduced by a Wireless Remote Controller. Reduction of camera movement may eventually lead to analyzing this data quantitatively using art editor software.