

The Twenty-First Annual



April 15, 2014

Memorial Student Union Ballroom

12:00 - 3:00 p.m.

**Twenty-First Annual
SWOSU Research and Scholarly Activity Fair
Tuesday, April 15, 2014**

Welcome to the Twenty-First SWOSU Research and Scholarly Activity Fair! On display today are over one hundred presentations involving 154 student researchers, writers, performers, and artists, and 47 faculty sponsors encompassing scholarly activity from the Departments of: Accounting, Computer Systems, and Entrepreneurship; Art, Communication, and Theatre; Biological Sciences; Chemistry and Physics; Engineering Technology; Kinesiology; Language and Literature; Music; Nursing and Allied Health; Pharmaceutical Sciences; and Psychology.

I wish to extend my personal thanks to all who played a part in making this event happen, particularly to President Randy Beutler and Provost James South for their continuing support of research and scholarly activity at all levels throughout the University. Special thanks, also, to Dr. Lori Gwyn, Interim Director of the Office of Sponsored Programs (OSP), for offering her expertise through this transitional period within OSP and for spearheading the organization of this event, and to Shannon Hawkins of OSP for her thorough editing of the abstract book. Thank you to Ms. Karen Wilson for her help in coordinating the online application process, and to Mr. Robert Barnes and his staff for setting up our facilities and providing refreshments. Finally, to the members of the University Research and Scholarly Activity Committee, thank you for your dedication and weeks of hard work to make this event a reality.

Most of all, congratulations to all faculty, staff, and administrative sponsors who dedicated significant time and effort toward integrating students into various forms of scholarly activity. Student research is now recognized as an essential ingredient in undergraduate education. It fosters independent, critical, and creative thinking skills, providing the unique opportunity to apply theories accumulated in various classrooms toward problem solving in the real world. And, from the student's perspective, there's the added excitement of potentially being the first to make a discovery, understand a problem, provide a solution, and/or make a creative contribution to the world.

I trust that you will find the research stimulating and the students' excitement infectious. Enjoy....

Sincerely,



Dr. Jason Johnson, Chair
University Research and Scholarly Activity Committee

Committee Members

Dr. Randy Barnett

Dr. Tami Moser

Dr. Richard Tirk

Dr. Denise Landrum-Geyer

Mr. Jess Parker

Dr. Muatasem Ubeidat

Dr. Evette Meliza

Dr. Faruk Khan

Poster Presentations

Please Note: The following presentations will begin at 12:30pm within the Student Union. Students on odd numbered panels are asked to be available in front of their posters from 12:30-1:30pm; students on even numbered panels are asked to be available in front of their posters from 1:30-2:30pm.

1. **Graphic Design Business.** Drew Brower (Dr. E.K. Jeong) Department of Art, Communication and Theatre

For my research topic I will present information on how to start a Graphic Design business. You need to be prepared before you just throw on an open sign on a building. On my poster I will present five main pieces of information that should be considered before starting your business.

1. Timeline – How much time before your business starts? What are the hours of your store? Etc.
2. Money – How much will your store cost? What will your prices be? How will your business do in the first six months? Etc.
3. Location – Where will your business be? Who is your competition? Etc.
4. People – Who are the clients you will be looking for? How many employees will you have? Are you working with a partner? Etc.
5. Identity – What is your logo? What will make you different from all the other businesses? Etc.

2. **Material Studies in Art.** Melissa Perez and Edward Bacon (Dr. E. K. Jeong) Department of Art, Communication and Theatre

A material study is literally the study of any material whether it be cloth or cardboard. What is the point of material studies? The whole point of playing around and studying materials is to see what all possibilities there are to do with them. Take a simple sheet of paper for example. There are more things to do with it other than tape it into a box. Why not turn it into a sculpture? Or simply see how it can support itself without the use of outside materials. How to make a material study? Quite honestly you just play with it Start with the obvious things. How would this piece of paper look like if it were crumpled? Folded? Torn? Now try doing something with it you wouldn't normally do. Burn it. Soak it in water. Layer it in all sorts of fashions. Now incorporate it with another material of your choosing. Like cloth. What if you layered the cloth and paper on top of each other? How about sewing them together? Whatever comes to mind try it out! You want to be able to manipulate the materials you are working with into creating something that you wouldn't normally see. It's more than arts and crafts. It is creating a whole new way to build something. You could almost consider it recycling really.

3. **Saturday Art.** Khanh B. Nguyen (Dr. E.K. Jeong) Department of Art, Communication and Theatre

The SWOSU Visiting Artist Program has initiated an art-teaching program, called Saturday Art, designed to reach out to the community and raise interest in creating art in the Western Oklahoma region. The program includes hands-on workshops in which members of the community, under the guidance of experienced artists, create artworks in various media.

The program is designed to enhance community understandings of the values and rewards of art and to create a wider arts community outside of SWOSU campus. In addition, the program is intended to support the efforts of SWOSU art students to enhance the communication skills they will need in their careers as art teachers and teaching artists. Art majors and club members of clubs such as the Art Club and the Graphic Design Association can volunteer to assist in workshops.

Saturday Art is open to the public, and all interested individuals and groups are welcome to participate and explore their potential in the visual arts. SWOSU professor E.K. Jeong, also the director of the school's Visiting Artist Program, supervises art major Khanh Nguyen, the coordinator of the program for spring of 2014 who conducts the undergraduate research of arts administration through the Saturday Art.

4. **A Hearty People—Profiles of Western Oklahomans.** Ms. Terry C. Ford, Department of Language Arts, SWOSU-Sayre

A book edited by Oklahoma's most prolific historical author, Bob Burke, is being published containing the work of SWOSU-Sayre students. For several semesters, students in Instructor Terry Ford's English Composition II classes at the Sayre Campus were assigned a research paper of 1600-3000 words over a person of interest--either living or dead--from the student's own hometown or anywhere in Western

Oklahoma. The research paper was to include primary and secondary sources, interviews, and photographs. Arguments had to be made in the conclusion of each essay as to why this person deserved being included in a book about noteworthy Oklahomans. Mrs. Ford submitted over 70 student essays for publication in the book, to be entitled A HEARTY PEOPLE--PROFILES OF WESTERN OKLAHOMANS. Prior to the release of the book, a selection of students' articles are appearing in OKLAHOMA: MAGAZINE OF THE OKLAHOMA HERITAGE ASSOCIATION.

The additional benefits to the participating students were as follows: (1) Students were aware their research papers would be viewed by more than just the instructor--that it had to be interesting, accurate, and scholarly. (2) The end product was not just the acquisition of a grade, but also publication--the highest purpose of exceptional writing. (3) This impetus resulted in more proficient and intellectual essays of an original nature including interviews of the subject and/or family and friends. (4) Knowledge of the student's own hometown hero increased cultural and historical awareness, as well as pride in the accomplishments of fellow Oklahomans.

A comment on the cover of the book sums up its significance:

"For the past two centuries, American Indians, European settlers, farmers, ranchers, and merchants settled Western Oklahoma, carving out for themselves a new home in a new land. They overcame many obstacles to forge for their descendants an incredible region in which to work and live. Western Oklahomans are indeed . . . A Hearty people." --Wade Christensen, First Gentleman of Oklahoma.

5. **The Effectiveness of Music Therapy for Children with Traumatic Brain Injuries.** Haley M. Woolsey (Dr. Sophia Lee) Department of Music

There is estimation that each year 1.7 million people are diagnosed with traumatic brain injuries. 673,259 of those people diagnosed with traumatic brain injuries are children. A majority of head injuries in children are from falling down and car collisions. Prevention is imperative among children in order to avoid all open and closed head trauma. In order to reduce the amount of children diagnosed with traumatic brain injury, parents can be more informed and aware of the causes of an injury. Rehabilitation is important for all children. There is significant importance in providing rehabilitation and recovery for all individuals, especially children. Depending on the location of the damage children can have serious issues later in life when it comes to long term planning, decision-making, motor movement, and basic life skills. It is important to grant individuals with every treatment they need in order to recover at their highest potential so they do not come across problems later in life.

Music therapy has proved to be effective in treating children with traumatic brain injuries. Music not only provides a way of communicating emotions, it also stimulates relaxation in the child's mind. Music strengthens and empowers the brain to work through a different recovery route than normal language, motor, emotional, or psychological treatment. Music therapists structure the sessions with neurologic music therapy techniques embedded within activities in order to rebuild the brain after the injury.

Literature was compared to provide more knowledge of music therapy and pediatric traumatic brain injury. The purpose of the comparison of literature was to view the different ways in which each therapist used music therapy in a session. In this research several factors were observed such as age, the number of participants, session length, area of impact, and techniques. The research concluded that each person required different needs according to the damage that impacted their brain as well as their body.

6. **3D printing and 3D Printing Technologies.** Brandon S. Earney and Jonathan B. Haworth (Mr. Dick Kurtz) Department of Engineering Technology

My name is Brandon Earney and my partners name is Jonathon Hayworth. We are doing research into the technologies of 3D printing. We are working towards repairing the 3D printers here in the Engineering Technology department and then using our research into the technologies behind 3D printing and knowledge gained from repairing the printers we will work with various groups participating in other research projects here in the Engineering Tech department to 3D print prototype their designs and display these prototypes and present the technology that lies in 3D printing.

7. **3D printing by Brandon Earney and Jon Haworth.** Brandon S. Earney and Jonathan B. Haworth (Mr. Dick Kurtz) Department of Engineering Technology

We have been researching into the technology behind 3D printing through the time frame of Capstone I and Capstone II. While Researching the growing technology of 3D printing we also have been troubleshooting and repairing both of the 3D printers that we have here in the Engineering Technology dept. For our final in Capstone II we want to present the discoveries along with SOP's made for the 3D printers here on campus. Through our presentation we will discuss the many advantages of 3D printing

and the vast opportunities that are possible with 3D printing industry. We will also display some 3D printed parts that were designed by Jon and I.

8. **A Method for Determining Three-Dimensional Shapes from Two-Dimensional Cross Sections: Application in Invertebrate Paleontology.** Katy B. Kirkpatrick (Dr. Brian Campbell) Department of Chemistry and Physics

It is often difficult to identify the family or genus of invertebrate univalve gastropod cast and mold fossils found in a sedimentary matrix. What is usually seen is but a two-dimensional slice of the object. This program investigates the use of three-dimensional extent univalve gastropod shells as an aid to the identification of two-dimensional images found in thin-sectioned fossiliferous rock. Using a grinding wheel, a wide range of known gastropods was ground in a set pattern along the X, Y, and Z-axis of rotation. From impressing on an ink-pad the know shell's two-dimensional footprint, comparisons can be made with actual fossils. This generated a database from which field samples can be compared.

9. **Student Based Paleontology Research Initial Report Of possible B. antiquus or intermediate species between B.a. and B.b. with a partial reconstruction.** Jill N. Dotson and Allison B. Bedell (Dr. Brian Campbell) Department of Chemistry and Physics

Found in southern Ellis Co., OK, seemingly random bones tell the story of the watery death of one, and long lives of several bison. Reconstruction of a possible B. antiquus or intermediate species between B. a. and B. b. is progressing. Samples of the soil from above, below, and within the bone bed were microscopically examined to assist in determining the paleo-environment. Students enrolled in the SWOSU Physical Geology class and volunteers were vital to this continuing research program.

10. **Increasing the Reactivity of Ni(II) Complexed Nucleophilic Glycine Equivalents for the Preparation of Unnatural Amino Acids.** Mackenzie C. Bergagnini (Dr. Trevor Ellis) Department of Chemistry and Physics

From the isolation of the first α -amino acid from a protein, glycine, the scientific community has been captivated with the enormous potential of these fundamental biological molecules. Complimentary research in the areas of chemistry, biochemistry, biology, and medicine have led to the discovery of several unnatural amino acids in their free form or as components of larger structures capable of curing illness, or alleviating the effects of diseases ranging from Parkinson's Disease, to the common cold. As a result, the synthesis of α -amino acids, especially those not found in nature, has been the basis of research for many years. Therefore, we wanted to investigate new methods for their preparation which were convenient, as well as cost effective. Our initial investigations revealed that the most convenient and general method for the preparation of unnatural derivatives of α -amino acids was the modification of glycine. This process involves the substitution of one or both of the hydrogen atoms on glycine with a new chemical entity. However, due to the low acidity of these bond(s), the process has yet to reach its full potential. Therefore, we designed, synthesized, and studied a new generation of highly acidic glycine equivalents. The increase in acidity provided by our design is significant and has opened new avenues for future inquiries into unnatural α -amino acid synthesis and pharmaceutical design. In conclusion, we have developed a new series of molecules which have demonstrated improved chemical reactivity for the preparation of unnatural α -amino acids while demonstrating environmental and fiscal responsibility.

11. **The Sultanate of Oman.** Mohammed Al-Subaihi and Yusouf Al-Ghazali (Ms. Tee Kesnan and Dr. Denise Landrum-Geyer) Department of Language and Literature

In this poster, the authors will introduce audience members to important aspects of Omani culture, including customs, political structures, and other traditions. Authors hope to answer questions and dispel some myths about the country in order to help western Oklahomans better understand this Middle Eastern country.

12. **Life in Saudi Arabia.** Feras Bukhari, Fahad Almutairi, Talal Alanazi, Mshal Almaqbal, and Abdullah Alghamdi (Ms. Tee Kesnan and Dr. Denise Landrum-Geyer) Department of Language and Literature

This poster presentation will focus on introducing audience members to cultural elements of Saudi Arabia such as the importance of dates to certain customs, Arabic writing, and traditional male dress. In addition, there will be information about traditional Saudi Arabian music.

13. **Saudi Arabian Culture and Dress.** Maryam Alkhaibari and Rahaf Aljohani (Ms. Tee Kesnan and Dr. Denise Landrum-Geyer) Department of Language and Literature

This poster presentation will introduce audience members to aspects of the Saudi Arabian culture such as dress and everyday life from the perspective of Saudi women. Authors hope to answer questions and dispel myths about their culture while giving people an inside look at this country.

14. **Chinese Culture and Customs.** Li Xia Wang, Qian Yang, and Ying Zhang (Ms. Tee Kesnan and Dr. Denise Landrum-Geyer) Department of Language and Literature

This poster focuses on introducing important aspects of Chinese culture to audience members, including an explanation of dance troupes, cultural symbols, food, Buddhism, and other traditions that have shaped China for centuries.

15. **Culture of Customs of Saudi Arabia.** Ali Al-Shawaf, Hamuod Abdullah Almorji, and Mohammed H Almomen (Ms. Tee Kesnan and Dr. Denise Landrum-Geyer) Department of Language and Literature

This poster presentation will deal with customs related to the dress, food, and importance of food to certain cultural traditions from the perspective of men in Saudi Arabia. Authors hope to invite audience members to interact and sample some small snacks frequently eaten in Saudi culture as well as explain traditional male costumes and their significance.

16. **An Introduction to South Korea.** Hyejin Kim (Ms. Tee Kesnan and Dr. Denise Landrum-Geyer) Department of Language and Literature

This poster introduces audience members to important aspects of South Korean culture and daily life as a way to open dialogue between American students and their international counterparts.

17. **Locking Receiver Hitch.** Kenneth R. Franke, Kevin R. Williams, and Tyler D. Colwell (Mr. Dick Kurtz) Department of Engineering Technology

Receiver Hitch that can be locked by a turn of a key. No pins used to personally lock or remove on hitch. Hitch can be removed or put on with just a single hand.

18. **Ventilated Hard Hat.** Jimmy R. Shackelford and Coleman R. Farley (Mr. Dick Kurtz) Department of Engineering Technology

We are making a ventilated hard hat with a built in fan to help with heat exhaustion. We will be presenting a poster and a working prototype. This is for Capstone with Dr. Kurtz.

19. **Multi-tool Cell Phone Case.** Clint C. Peck (Mr. Dick Kurtz) Department of Engineering Technology

In an effort to study the life cycle of an invented product through the manufacturing life cycle, I developed a product and went through the task of deciding how to create a useable product to solve a problem that is faced by many people.

Almost everyone has encountered a time where you need a screwdriver or a knife to perform some simple task while you're out on the go and don't have anything with you except your keys, wallet and your cell phone. In today's society cell phones have become a huge part of our lives and are usually with us all the time. So why not design a cell phone case that is a multi-tool. Inventing a new product is not just coming up with an idea. It involves many steps like product design, what materials should be used to produce it, and how it will be produced.

20. **Do Students Majoring in a Health Related Field Have a Higher Level of Health and Fitness When Compared to Other College Students?** Ms. Amber D. Sturgeon, Department of Kinesiology

Purpose: The purpose of this study was to examine the overall health and fitness of students who major in health related careers compared to students who major in non-health related careers. It was hypothesized that the health related majors would have better fitness and overall better health than the non-health related majors. Methods: The Polar TriFIT machine was used to measure students' level of health and fitness. The TriFIT system is an integrated health management system that performs a complete health

profile for individuals. The TriFIT measures biometrics, body composition, flexibility, cardiovascular endurance and muscular strength and endurance. Participants included 208 college students at a mid-western university. Results: The results of this study reveal that many college students and even those majoring in health related fields have similar health and fitness levels. However, a significant difference was noted in overall flexibility between the two groups. Students majoring in health related fields had higher levels of flexibility [$F(1,208) = 5.326, p = .022$] when compared to non-health related majors. No significant differences were found between the two groups in other measures of health, such as, body composition, resting heart rate, strength and blood pressure. Discussion: College students are vulnerable to a number of unhealthy behaviors. College campuses have the opportunity to promote, educate and directly encourage students to be successful in achieving positive wellness behaviors and lifelong health. Health and wellness courses can play a significant role in endorsing and encouraging college students to make healthy choices and to regularly engage in exercise. Therefore, carefully designing programs and curricula can potentially have an influence on the behavior, knowledge and attitude of health and wellness for this population.

21. **Game: The American Writer.** Bailey G. Martin (Dr. Viki Craig) Department of Language and Literature

Bailey Martin in her Issues in American Literature course devised, with the help of two classmates, a game strategy for review of American literature--a formative assessment she can use in her own secondary English classroom when she graduates. On the poster is a collage of images of the authors and literature surveyed in historical context. Below the poster is the original game board she created herself with game pieces and questions and instructions on how to play the game; she used Monopoly as a means of guiding her design. She will be around to help you try your luck with this comprehensive review, along with one other student on her team and the professor.

22. **Elucidation of Critical Skills Thinking by applying Responsibility Driven Design to 2d and 3d Character Generation and Animation using Anime Studio 10.** Mary Ann Phillips, Mike Morrison, and Adam Hawkins (Dr. Warren Moseley) Department of Accounting, Computer Science, and Entrepreneurship

Anime are Japanese animated productions usually featuring hand-drawn or computer animation. Anime is a diverse art form with distinctive production methods and techniques that have been adapted over time in response to emergent technologies. Responsibility-driven design is in direct contrast with data-driven design, which promotes defining the behavior of a class along the data that it holds. Data-driven design is not the same as data-driven programming, which is concerned with using data to determine control flow not class design. RDD is concerned with the roles and responsibilities of each of the individual characters or parts of characters and the interactions between object in the scenes or series of scenes. Much of the animation that is in today's shorts is created on they fly. There is little or no thought that goes in to the long-term pervasive nature of objects and object flows. In this poster we demonstrate how to create an RDD based Anime Animation using RDD.

23. **Analysis and Visualization of Complex Data for Research in Higher Education.** Mary Ann Phillips (Dr. Warren Moseley) Department of Accounting, Computer Science, and Entrepreneurship

In studying visualizations, the open source browser based graphing tools were found to be the most convenient and simple form of visualizing data; although this is true, these interfaces were found to have many flaws such as how the users are limited by the boundaries set by tools, inability to handle large amounts of data (long-form data), and having extra software requirements or signing up for accounts. These characteristics were observed by our team as well as through a survey run by our team. This survey showed people most preferred Many Eyes and least preferred Fusion.

The visualization library by R, on the other hand, was found to be more complicated and time consuming, but also more capable of handling large amounts of data and being customizable while not requiring extra software downloads or accounts to manage. The tradeoff is the complexity in setting up the code base and format the data properly for visualization. In addition, it is more difficult to share data and visualization and statistical results.

24. **"If we only knew what we know": The elucidation of Knowledge Management skills for Small to Medium scale business in Rural Western Oklahoma.** Rosalee Adams, Amanda Adams, Ashley Cole, and Sam Maddux (Dr. Warren Moseley) Department of Accounting, Computer Science, and Entrepreneurship

This project reflects insight into the Knowledge Skills Acquisition and Knowledge Sharing for Small to Medium Sized Businesses in Rural Western Oklahoma. By providing small business with a foundation of quality based in the Malcolm Baldrige National Quality Award. Since 2008 the Baldrige Award has been extended to cover non-profit and smaller organization. However it remains prohibitive to compete in the Baldrige Process small businesses can profit from a knowledge intensive model based on the Baldrige Process. In this project we created a Wordpress web site to assist small businesses determining the value of and the process by inserting Knowledge Management into their regular Strategic Planning and Analysis processes. We provide a 4 phase - 10 Step Knowledge Management Toolkit to assist interested businesses. This web site will provide justification for knowledge as an asset, and quality as a foundation to achieve business success. By providing the ability to examine the existing framework for decision making in the rural western Oklahoma small business.

25. **Using Grid Technology to Enhance Render Time for 3d Parallel Imaging and Animation.** Hayden Harrington and Rico Rivera (Dr. Warren Moseley) Department of Accounting, Computer Science, and Entrepreneurship

Rendering 3d images and animation take an enormous amount of computational technology. In the past renders could take many hours using conventional Pcs. Grid Technology allows one to eliminate all that creative downtime by taking advantage of the power of network rendering. In this project we build a simple render farm of up to multiple nodes with up to hundreds on cpu cores. This frees one to continue working on your next piece while the tedious rendering is handled seamlessly in the background. The emphasis is on flexibility and building images in a farm can be utilized by every user and designer in an organization in your organization, so all of your creative workstations can remain productive.

26. **Responsive Web Technology and the Explosion of Javascript on Teaching Web Development.** Matt Lanier and J.J. Stout (Dr. Warren Moseley) Department of Accounting, Computer Science, and Entrepreneurship

The web today is a growing universe of interlinked web pages and web apps, teeming with videos, photos, and interactive content. What the average user doesn't see is the interplay of web technologies and browsers that makes all this possible. Over time web technologies have evolved to give web developers the ability to create new generations of useful and immersive web experiences. Today's web is a result of the ongoing efforts of an open web community that helps define these web technologies, like HTML5, CSS3 and WebGL and ensure that they're supported in all web browsers. The color bands in this visualization represent the interaction between web technologies and browsers, which brings to life the many powerful web apps that we use daily. The Web, already one of the fastest developing areas in technology, is accelerating. This is both good news and bad news for those of us planning to draw income from writing software. Today, good developers have the rare opportunity to do what they love, grow their horizons, and continually evolve and derive even greater satisfaction from their work, as long as they're willing to put in the hard work necessary to understand a huge back catalog of rapidly-expanding knowledge. Terrific careers come at a price. As a software developer, you must continually search for the next great tool that will help you achieve more, better, faster. What you work with 10 years from now is going to be a major departure from what you are working with today—in essence, you will be retraining yourself multiple times to keep sharp.

27. **Analysis of a 2012 Record of Decision for Surveillance Towed Array Sensor System Low Frequency Active (SURTASS LFA) Sonar.** John D. Bui (Dr. Sylvia Esjornson) Department of Chemistry and Physics

The SURTASS LFA sonar is a two-component, long-range detector suspended by cable underneath naval vessels. Its primary purpose is to act as a preemptive measure against submarines. The SURTASS component transmits waves passively, while the LFA component transmits low frequency waves at irregular intervals. The operation of the sonar device has the potential to affect marine animals in proximity through any of the following: non-auditory injury, permanent/temporary threshold shift, behavioral change, masking, sense impairment, and stress. Although SURTASS LFA sonar was deemed to have a negligible to minimal effect on marine organisms as well as humans, additional precautions have been set in place to further reduce any potential effects. The first precaution is the establishment of geographical restrictions, which prohibit the exercise of naval operations within 22 km of coastlines and in offshore biologically important areas (OBIA's). The second precaution is monitoring mitigation through visual and passive/active acoustics. The decision itself is a renewal of an issuance of a five-year rule under the Marine Mammal Protection Act with additional OBIA's appended.

28. **Perforating Gun Loading/Assembly Process Improvement.** Johnny V. Covalt and Tyler Haden (Mr. Dick Kurtz) Department of Engineering Technology

My partner and I are improving the process of loading and assembly of perforating guns for an assignment required by our major. It will display the process improvements made (before/after). We will also be improving the floor layout for the facility to improve throughput, efficiency, and safety.

29. **Aerial K-9 Project.** Nick H. Rymer (Dr. James Hubbard¹ and Mr. Brad Bryant²) University of Maryland¹; Department of Engineering Technology, Southwestern Oklahoma State University²

o First Responders need a reliable tool for use in assessing disaster areas and to assure the safety of personnel and equipment during operations. A UAV (Unmanned Autonomous Vehicle) surveillance system that is easy to operate and that can serve as their eyes and ears for improved situational awareness is the aim of this Aerial K9 project.

o The initial investigation will consist of evaluating a number of low cost sensor suites in order to obtain an understanding of the behaviors of the UAV when using autonomous programs. This sensor suite will include several sensors e.g. sonar, infrared, laser, etc. and be used to develop algorithms that can be used as a failsafe for fault tolerance.

o Utilizing an open sourced program called OpenCV (open source computer vision) and a camera together we propose to develop an object detection system. OpenCV is software that's developed to detect objects, faces, 3D map objects, and detect movements, just to name a few of its capabilities. Object recognition will be the basis for object avoidance and facial recognition that could be used as a safety feature to prevent unsafe flying near people.

30. **Spanish Translation Project.** Alyssa L. Friesen (Dr. Cynthia Peña and Dr. Hector Garza) Department of Language and Literature

This project is an English Translation of "Una leyenda de los indios miskitos de Nicaragua". This legend is about the Miskitos Indians of Nicaragua. It references the first contact between the indigenous culture and the exterior world. This is a legend that we read in Intermediate Spanish Composition and Grammar. I often translate the readings we do in class so that I understand them better.

31. **The Deaf can Hear.** Mary Hull (Dr. Sophia Lee) Department of Music

It is assumed that the deaf cannot participate in music therapy because they cannot hear. Using vibrations, technology and any hearing they may have music therapy can be just as affective in people with hearing loss as those without. This presentation will summarize the findings of how deaf process sound. Using that information it can be shown how music therapy can be affective on a person who is deaf or hard of hearing.

32. **Binaural Beats: A Comparative Study of Specific Studies.** Rebecca A. Cantrell (Dr. Sophia Lee) Department of Music

Binaural beats are used within audio (typically music) tracks to purposefully entrain brain waves in order to stimulate the same areas of the brain that are stimulated while on other hallucinogens. Few studies have been done on the psychological and physiological effects of binaural beats upon the listener. This study will compare the results of several different studies on the effects of binaural beats.

33. **The Use of Music to Minimize Pain.** Melissa A. McCormick (Dr. Sophia Lee) Department of Music

The purpose of the study is to explore the implementation of music as an alternative to using medication for pain management. Do doctors and other health care advisors in the Oklahoma City area know about music therapy? Would they be willing to prescribe music or music therapy to a patient instead of medicine? The intention of the study is to survey doctors, health care advisors, and health administrators to see what they know about music therapy and if they would be willing to use alternative methods to pain management. The study would also take note of how many medical professionals know what music therapy truly is.

34. **The Effects of Music Therapy on Combat PTSD.** Brittany N. Carter (Dr. Sophia Lee) Department of Music

This project is intended to look into the effects of Music Therapy techniques. There is already some research that covers this topic, however, there is not that compares the effectiveness of certain techniques. With these findings it is hoped to use Music Therapy as a widely used and accepted form of treatment for Combat Post Traumatic Stress Disorder.

35. A Proposal For Survey Study On Stressors To Music Therapists In Hospice And Palliative Care. Yi-Wei Huang (Dr. Sophia Lee) Department of Music

Professional caregivers working in hospice and palliative care may go through suffering, grief, and death. Palliative care is as a specialty field its workers are subject to a unique set of stressors in addition to some standard ones reported by other health care professionals (Clements-Cortés, 2006). There are different factors and stressors professional caregivers may experience. For music therapists working in hospice and palliative care, little is known about their stressors and whether they suffer stress more than other professional caregivers. The purpose of this paper is to form a survey of the stressors experienced by music therapists through investigating the stressors from music therapists and other professional caregivers in palliative and hospice care. Results indicate the dependent variables used in the survey for music therapists to identify.

36. The Effects of Music Therapy on Pediatric Oncology Patients: A Literature Review. Michelle Low (Dr. Sophia Lee) Department of Music

This presentation will summarize the current music therapy interventions for pediatric oncology patients. Examples of non-music therapy interventions will also be discussed.

In the United States, it is estimated that 10,400 children under age 15 were diagnosed with cancer and about 1,545 children will die from the disease. Although cancer is the leading cause of death for children below the age of 15, gradual advances in pediatric cancer treatments have greatly increased the number of children who now survive. Medical treatments include chemotherapy, radiotherapy, and medication.

Granted that medical procedures could cure cancer effectively, the majority of children experience difficulty in coping with the pain and stress coming from these treatments. This in turn prolongs the hospitalization stint and might cause side effects on the child's psychological development, quality of life, and family functioning.

Thus, to promote a better quality of life and coping strategies, the use of music therapy in medical settings is incorporated over the years. The two main goals of music therapy would be pain management and anxiety reduction. Music therapy interventions include improvisation, instrumental playing, song writing, music and relaxation, singing, and live music making. Family members were also asked to participate in the music making to enhance bonding and give support to their children. Besides the points mentioned above, music therapy acts as a component of remembrance, communication and an outlet for emotions for bereaved parents with their terminally ill child.

The purpose of this presentation is to emphasize on the benefits of music therapy in medical settings and create awareness in medical personnel to recognize music therapy as an effective tool for treatment. It also gives fellow music therapists to explore and brainstorm for new ideas concerning this population setting. On top of this, it opens doors for more co-treatments with therapists from other aspects of treatment.

37. Second Impact Syndrome and the Effects on the Brain. Kayla M. Johnson, Trixie A. Russell, and Kaci E. Spence (Ms. Leah Cox and Ms. Jessica Young) Department of Nursing and Allied Health, Athletic Training Education Program

Subjective: Second impact syndrome can only happen if a concussion has already occurred and is not yet healed. Onset is chronic/acute. Characteristics and severity of pain may be different for each individual.

Objective: Sudden collapse, Loss of consciousness, No eye movement, No pupil reaction, Possible cardiac arrest, Possible respiratory failure, Positive Halo Sign.

Treatment: Subject should be stabilized properly on a spine board with a cervical collar. Also checking for breathing and airway clearance if unconscious. Once stabilized the subject should be sent to the hospital immediately for proper care and management of injury. Care includes CT scans and functional MRIs to look at the brain more closely. Surgery may be required for very severe cases to relieve pressure off the brain. If not managed correctly, second impact syndrome could lead to death.

Prognosis: Second impact syndrome has a very high mortality rate. Meaning that very few people survive from this injury, and if they do survive, the probability of them returning to normal life is virtually nonexistent. People that do survive can suffer from loss of ("speech, cognitive ability, sensory ability,

vision, hearing, smell, taste, loss of pupil reaction”).

The Neurometabolic Cascade: efflux of potassium from axons, influx of calcium, highly active sodium/potassium pump, requiring large quantity of ATP, accelerated glycolysis increasing lactic acid and impairing oxidative metabolism. This “hyper metabolism” occurs in the setting of diminished cerebral blood flow, and the disparity between glucose supply and demand triggers a cellular energy crisis. The resulting energy crisis is a likely mechanism for post concussive vulnerability, making the brain less able to respond adequately to a second injury and potentially leading to longer-lasting deficits.

Conclusion: Second impact syndrome is a serious condition that affects the brain and its function. It is an injury that should not be taken lightly. If managed well, it is still a serious condition but can be corrected. Though if not managed well, it can be fatal.

38. **X2 Biosystems.** Jacklyne D. Manning and Ryan McKee (Ms. Jessica Young) Department of Nursing and Allied Health, Athletic Training Education Program

Context: The limited use of the X2 Biosystems products has brought questions concerning how this product works and when it will be made available for use for all teams. Objective: Discuss what the x-patch is and how it works, what teams are using this product and also what sports would get the most benefits of using this product. Topic Discussion: X2 Biosystems has developed two products to help athletic trainers better detect concussions. These products are not to be used to diagnose, but to help get real time feedback and better protect athletes from developing long term problems from too many concussions that go unreported. The product that we will be focusing on is the x-patch. When wearing the x-patch after a hit a signal is sent to the software on the sideline and it shows how hard of a hit an athlete took. Information gathered by the X2 sensor modules is transmitted by the X2Net wireless protocol to the X2 access point located at the sideline and recorded in our secure Windows Azure cloud database. Application: X2 was not invented to diagnosis concussions, but to assists athletic trainers and coaches with real time information. To apply the patch to an athlete first remove the device side adhesive liner, and then apply the activated x-patch to the adhesive liner. Next remove the skin side liner of the x-patch, then the device is ready to be applied behind the athlete’s ear. Remove all the hair from behind the ear and be sure not to place the x-patch in the hairline. Press firmly down the X2 device and all edges of the patch to insure maximum grip. To tell if the device is properly recording gently tap the x-patch and you will see a single green light with each tap indicating that the device is recording. To safely remove the x-patch grab any of the edges and gently pull away from the athletes head, remove the adhesive from the back of the device and place it back onto the charging dock. Teams using the X2 products: Washington, Notre Dame, UCLA, and Stanford. Specific Sports: Football and Soccer are sports where you see a lot of concussions, but the X2 products are made to be used by anyone, and are also not only used by athletes. Conclusions: Overall the X2 products can be used by a wide range of people. The goal of X2 Biosystems is to get this technology to as many people of the active population as possible. High school, youth, and NCAA coaches and athletic trainers all tell us that they need tools like the X2 system that give them accurate, clear data, and enable them to comply with new laws. CDC estimates reveal that 1.6 million to 3.8 million concussions occur each year. With these products the hope is that number of undetected and unreported concussions will go down.

39. **Rehabilitative Exercises – Isometric, Isotonic, and Isokinetic.** Kamden Phillips and Jeff Pratt (Mr. Kris Mahlock) Department of Nursing and Allied Health, Athletic Training Education Program

Isometric, isotonic, and isokinetic exercises are all types of exercises that can be utilized in the rehabilitation process to help to restore range of motion, strength and functional ability when working to return an athlete back to playing condition. Objective: To help to differentiate the three types of exercises and to explain when and why each type of exercise is used. Topic Discussion: What are isometric, isotonic and isokinetic exercises and how do they benefit an athlete in the rehabilitation process. Advantages: Each exercise has advantages that can be noted. Isometric exercises are convenient and easily performed, can be done without any machinery or weights and pose a very slight chance of injury or harm to the body. Isotonic exercises can increase and sculpt muscles, can help with specific muscle responses that are found within the world of athletics, and can improve strength throughout the muscles entire range of motion. Isokinetic exercises are designed to prevent injury from exercising and can be customized for each individual’s specific need with the use of the person’s body momentum. Disadvantages: Isometric exercises come with the risk of increasing blood pressure. Individuals with high blood pressure must be careful when performing these exercises. With isotonic and isokinetic exercises, the equipment and space needs can be a problem. These exercises require machinery or free weights that are usually expensive. Equipment: Isometric exercises usually don’t require any type of equipment. Isotonic exercises require free weights such as dumbbells and weights used in bench pressing and

squatting. Isokinetic exercises require weight lifting machines that have adjustable weight or resistance, just like ones seen in most gyms and wellness centers. Conclusion: The use of these different types of exercises can help to greatly improve the strength and range of motion needed to return an athlete back from an injury. Each is used at a specific time of the rehabilitation and when combined together make a great plan for getting an athlete back to the field or court.

40. **Platelet Rich Plasma Therapy.** Jim T. Bui and Brandon J. Pounds (Mr. Kalyp Oliver) Department of Nursing and Allied Health, Athletic Training Education Program

Context: The use of Platelet Rich Plasma Therapy (PRP) in the Sports Medicine field brings questions of concern as to how this process works and who among the population is using it. Objective: To discuss what Platelet Rich Plasma Therapy is and how medical professionals utilize the therapy, also which type of population is more likely to use this type of rehabilitation. Topic Discussion: Definition: Platelet Rich Plasma Therapy is a non-surgical treatment for soft tissue injuries and joint pain. PRP stimulates the body's natural healing forces. It is a substance that is made from your own blood to trigger the healing process. It merges cutting-edge technology with the body's natural ability to heal itself. PRP is a concentration of platelets containing specific packets of growth hormones and cytokines that tell the tissue to increase rebuilding to enhance healing. When PRP is injected into the damaged area, it triggers the healing waterfall which leads to restored blood flow, new cell growth, and tissue generation. Application: Platelet Rich Plasma Therapy is a rehabilitative procedure that enhances the healing process using the patient's own plasma. The goal of the therapy is to re-initiate the healing process and decrease the amount of time needed to heal. It can be used for any musculoskeletal injury; this includes sprains to ligaments, strains to tendons, damage to cartilage, or any injury caused by inflammation. This therapy can also be used for an analgesic effect for postoperative patients to aid in pain management. Three to five milliliters of blood is taken from the patient and put into the centrifuge machine. The blood is then separated into red blood cells and plasma. Once the process of separation has stopped, the patient's plasma is then put into a sterile syringe and injected into the affected area. The treatment takes anywhere from two to six weeks to take effect in the patient's body. Professional Athletes that have used the PRP Therapy: Tiger Woods, Hines Ward, Kobe Bryant, Ray Lewis, Troy Polamalu, and Takashi Saito. Specific Usage: There is no specific injury for this type of therapy. PRP is an application that is used for many different injuries. Conclusion: Taken as a whole, PRP can be a practical way to enhance the healing process, not only in the athletic community but anyone who sustains an injury in the community.

41. **College Student Preferences For Etextbooks Vs Traditional Textbooks.** Crystal Gaylord (Dr. Stephen Burgess) Department of Psychology

Introduction: The use of ebooks is increasing dramatically (PEW Report, 2012). A comparable increase in t-textbooks has not been seen but e-text use is increasing as legislatures and public schools look for ways to curb costs and to make textbooks more appealing to students. E-texts are also becoming more accessible as more students have mobile devices. Motivations for using e-texts include cheaper cost, greater customizability, and increased portability. Very little research has examined student's perspectives on reasons to buy, use, or potential problems with an e-text book. It has been assumed that students, especially college students, would flock to etexts. In the present study we examined college student's ratings of etexts and their reasons for selecting an etext vs. a traditional textbook.

Method:

Participants: 100 college student from a medium sized regional university completed the survey materials.

Materials: A survey was used to measure demographics, experiences with ebooks/etextbooks and attitudes towards ebooks/etextbooks.

Results: A series of group comparisons were conducted examining the differences in attitudes and ratings of etextbooks for those who reported owning an e-compatible device vs those who did not. Overall the pattern of results indicated no significant differences between the groups.

A series of group comparisons were conducted examining the differences in attitudes and ratings of etextbooks for those who reported having used an etextbook for class vs those who had not. Those who had used etextbooks for class reported greater overall satisfaction with etextbooks. They were more likely to say they would recommend an etextbook to a friend, more likely to say an etextbook would meet all their study needs, and to say they would study more often if they used an etextbook.

Conclusions: Students who had used etextbooks were more likely to be report favorable attitudes towards them than those who had not. Surprisingly those who owned ebook devices were not more favorable in their perception of etextbooks than those who did not.

42. **Effect of exposure to profanity on use of profanity in Live environments.** Christopher Stevens (Dr. Stephen Burgess) Department of Psychology

Introduction: Exposure to profanity has been shown to increase aggressive thoughts, expectations, and feelings (Ivory & Kaestle, 2013). However previous research has been conducted in the lab with profanity used by the characters in the game itself. There have been reported examinations of the effect of exposure to profanity in the Live video game environment.

There are over 48 million X-Box Live and Play Station 100 accounts. The Live video game environment permits players to communicate with others in real time in a potentially anonymous manner or in parties with those they likely know (Stevens et al., 2012). There has been little examination of the effect of profanity in this primarily unregulated environment. We conducted a naturalistic experiment where profanity and sex of player were manipulated to measure the effect of these variables on the profanity use of other players in the Live environment.

Method: 160 X-Box Live first person shooter games (e.g., Halo, Call of Duty) were played and recorded.

Results: Overall there was a significant main effect for profanity present in the recording such that when the recorded voice used profanity there were more games in which the other players used profanity. This pattern was observed for 6 of the 7 categories of profanity coded.

Overall, there was a significant main effect of sex of speaker such that when the recorded male voice was used there were more games in which the other players used profanity than when the female voice was used. This pattern was observed for 5 of the 7 categories.

The interaction of sex of talker and presence of profanity in the recorded script was not significant for 5 of the 7 categories of profanity.

Conclusions: This study represents the first known report of the effect of sex of talker and presence of profanity on the profanity used by players in the Live video game environment. When paired with previous research suggesting that hearing profanity may increase aggressive tendencies our results suggest that the effect of exposure to profanity warrants increased investigation.

43. **Power posing: The psychoendocrinological impact of sexualization of women.** Ashley Murray, Maci Glasscock, Gwen Burgess, and Patra Kositchaiwat (Dr. Melinda Burgess¹ and Dr. Lisa Appeddu²) Department of Psychology¹, Department of Pharmaceutical Sciences²

Women have been striving for an equal share of educational and economic opportunities and have made significant progress in the last 100 years. There is also an increasing trend though for visual media to portray women in the most base and sexualized manner (Killing us Softly, DreamWorlds). Additionally, there is a burgeoning body of work that illustrates these hyper sexualized portrayals have a negative impact on young adults' perceived sex-roles and sexual beliefs (Ward, 2005), sexual health (Wingood et al, 2003), attitudes about sexual harassment (Dill, Brown & Collins, 2008) and attitudes about rape (Burgess & Burpo, 2012).

Given the negative impact, one might be surprised to learn that this same sexualization is frequently rebranded as 'empowering' for women. In a scathing expose, Levy (2005) illustrates the numerous ways that women are sexualized and objectified, all in the guise of empowerment. Is it possible that this sexualization truly does represent empowerment for women of the 21st century? Considering the history of women's sexuality, it is conceivable that exhibiting one's sexuality is liberating. This is our primary research question.

Carney, Cuddy & Yap (2010) demonstrated that assuming a position of high power raised testosterone levels and lowered their cortisol levels. Conversely, assuming a position of low power lowered their levels of testosterone and increased cortisol levels.

Using Carney et al's procedure, we tested the effects of assuming a sexualized pose in women. If this sexualization is liberating and empowering, then the women in these poses should show elevated testosterone levels and decreased cortisol levels. However, if it is degrading, as many psychologists argue (see the APA Task Force on the sexualization of girls, 2007), then the cortisol levels should rise and testosterone levels should fall.

We had a 2x2 design with the following variables: Power of pose (low vs. high – between subjects), and Sexualization (yes vs. no – between subjects).

Results will be discussed in terms of how sexualization impacts women's cortisol and testosterone levels.

44. **Evaluation of collection and laboratory methods used in salivary hormone determination.** Patra Kositchaiwat, Gwen Burgess, Ashley Murray, and Cord Gothard (Dr. Melinda Burgess¹ and Dr. Lisa Appeddu²) Department of Psychology¹; Department of Pharmaceutical Sciences²

The objectives of this study are to investigate the collection and laboratory procedures of using saliva to

determine cortisol and testosterone levels in human subjects. This study is part of a larger experiment (Cognitive and Physiological Components of Memory for Media). Two sets of salivary samples were collected based on the procedures and supplies provided by Salimetrics, LLC. In one set, samples were collected before and after conducting a physical pose to evaluate whether any change from baseline occurred. In a separate set of samples, samples were collected after subjects had not or had chewed gum, which is used by some researchers to promote salivation and ease of sample collection. Samples were stored at -40 degrees Celsius until analyzed in duplicate using Salivary Assay kits for cortisol and testosterone (Salimetrics, LLC). Factors that will be evaluated include: (1) the ability to produce a standard curve using a 4-parameter non-linear regression curve fit ($R^2 > 0.90$); (2) accurate detection of known amounts of hormones in both control and spiked samples; (3) repeatability within samples and across plates; and (4) hormone levels resulting from the sampling conditions described previously. The results obtained from this pilot study will validate the methodology needed to conduct the larger experiment in evaluating the salivary levels of cortisol and testosterone in test subjects exposed to different stimuli.

45. Does sex sell? Not for women! Sexualized commercials negatively impact purchase intentions.
Ashley Murray and Aileen Aiello (Dr. Melinda Burgess) Department of Psychology

Introduction: Previous research has found that watching a television show with sexualized content lowers people's memory for commercials in the show (Bushman, 2005) and that sexualization in commercials do not increase memory when compared to neutral commercials (Bushman, 2007; Parker & Furnham, 2007). Other research studies have shown otherwise though, finding that memory for sexualized commercials is better (Ferguson, Cruz, Martinez, Rueda, & Ferguson, 2010). This study examined students' perceptions of sexualized versus non-sexualized commercials and measured their memories for the commercials to study the efficacy of using sexualization as an advertising technique.

Methods: This study was a between subjects design measuring people's memory for commercials and their ratings for the companies as a function of the sexualization of the imagery. Students viewed 10 commercials. Commercials consisted of either 10 neutral commercials or 4 sexualized commercials embedded in 6 (of the 10) neutral commercials. Sexualized commercials met the criteria for sexualized and objectified using the APA's Taskforce on the Sexualization and Objectification of Girls and Women in the Media (2007). They took a 10 question memory quiz over the commercials they saw. All participants were treated in accordance with APA's guidelines for the ethical treatment of human subjects and the university IRB approved the study.

Results: 131 students (58 female, 73 male) completed the experiment as credit for partial completion of a course requirement. The average was 19.22 ($SD = 1.372$). Students in the sexualized group remembered more ($M = .932$, $SD = .020$) than students in the non-sexualized group ($M = .878$, $SD = .018$). This finding was significant ($F(1, 3) = 3.959$, $p < .05$). Additionally, students rated the companies that used sexualized imagery as less appealing, and there was a significant main effect for group ($F(1, 127) = 30.978$, $p < .001$), which interacted with sex ($F(1, 127) = 39.736$, $p < .001$). Students were also less likely to indicate that they would buy a product from companies who used sexualization, with a significant main effect for group ($F(1, 127) = 5.025$, $p < .03$), which interacted with sex ($F(1, 127) = 1.766$, $p < .001$).

Conclusion: Contrary to previous research, our study found that students' memory was improved for sexualized commercials. It is important to note that while memory was improved, this improvement may not be beneficial to advertisers. Students perceived the commercials' companies as less appealing and were less likely to indicate that they would buy a product from the company.

Not only does using sexualization correlate with poorer reflection of the company by consumers, but given the APA's detailed compilation of the negative effects of sexualization, companies should consider the use of sexualization in their advertisements as part of their responsible business conduct. Future research should examine consumer behaviors as a result of sexualized advertising more closely. For example, are consumers more likely to buy the products in a more realistic buying situation? Additionally, do viewing these sexualized commercials change the way that people view how competent women are?

46. Sexualized Education: Sexy breast cancer commercials do not increase knowledge acquisition.
Ashley Murray, Catherine Schubert, and Maci Glasscock (Dr. Melinda Burgess) Department of Psychology

Introduction: Previous research has found that breast cancer commercials are more likely to sexualize and objectify women, and were less likely to contain accurate medical information as compared to heart disease commercials (Murray & Burgess, 2012). Additionally, a previous study also found that the top three most frequently viewed breast cancer commercials from YouTube, as compared to three health food commercials, did not increase young adults' knowledge about breast cancer (Murray & Burgess, 2013).

This study investigated the effects of viewing the top three most popular breast cancer commercials, on knowledge acquisition.

Methods: Students viewed either the top three viewed breast cancer commercials from YouTube or three healthy food commercials that are popular with women from YouTube, which were used in a previous study (Murray & Burgess, 2013). Students were then asked to view a website designed for this study which included content popular to young women such as career information, recipes, relationship columns, crafts, health information, and fashion columns. Students then rated the website and completed a memory quiz over the commercials. All students were treated in accordance with the APA's guidelines for the ethical treatment of human subjects and the university's human subjects review board approved the study.

Results: 51 female psychology students from a medium sized southwestern regional university completed the experiment as credit for partial completion of a course requirement. The average age was 19.78 (SD = 2.715). Women in the breast cancer commercials group were no more likely than the healthy commercials group to visit the breast cancer pages (χ^2 (df = 1, N = 51) = .013, $p > .5$, Cramer's V = .016). Additionally, women who viewed the breast cancer commercials did not know more of the symptoms of breast cancer (t (51) = .853, $p > .3$, nor did they score better on the different quiz aspects including mammography knowledge and breast self exam knowledge (F (2, 51) = 1.156, $p > .1$; Wilk's Λ = .953, partial η^2 = .946), or on knowing the frequency of breast cancer (χ^2 (df = 1, N = 50) = .000, $p > .8$, Cramer's V = .000).

Discussion: Since these breast cancer commercials do not increase women's knowledge of breast health (Murray & Burgess, 2013) and do not increase women trying to gain more information about breast health, the question remains: what role are these commercials are serving? Breast cancer campaigns should reevaluate how they commercialize breast cancer. Health commercials have been used effectively to alter consumer behavior and smoking. Future research should study whether those techniques could increase knowledge and knowledge acquisition. Additionally, future work with commercials such as these should examine how these portrayals influence women's judgments about breast cancer treatment options.

47. The Correlation of Coping Styles and Anxiety for Youth in Residential Treatment. Gwen Burgess (Dr. Randy Barnett) Department of Psychology

Introduction: Problems associated with juvenile delinquency have serious and often long-term effects on both the individuals and society at large. Previous research shows that high usage of emotion-oriented coping strategies is associated with anxiety and depression, while task-oriented and avoidance-oriented did not predict any level of psychological distress (Christine et al., 2002). The literature often does not specifically address the juvenile delinquent population, and more needs to become known in order to improve the treatment, general health, and wellness of this group. Most juvenile delinquents have already evidenced poor decision making tendencies and thus would benefit from better coping strategies.

Previous research suggests that when in higher stress situations, emotion-oriented coping is positively correlated with anxiety. These lines of research do not address juvenile delinquents specifically, however. This research is designed to assess the relationship between the coping style and level of anxiety upon arrival to a residential facility for juvenile delinquents.

Method: Participants consisted of 137 juvenile delinquent males between 13 and 18 years of age, who were in an out-of-home placement Level-E residential facility.

Results: The Multidimensional Anxiety Scale for Children (MASC) pre-test was significantly correlated with the 3 pre-test Coping Inventory for Stressful Situations (CISS) categories (r 's .22 to .55). A multiple regression analysis was performed to explore the variance that the 3 pre-test CISS categories explained in the MASC pre-test. The total R^2 was 32% with the pre-test CISS Emotion category being the only significant predictor.

Discussion: This study furthers the knowledge base by examining the relationship between coping style and anxiety, specifically in male juvenile delinquents in a residential setting.

48. Career Decision Self-Efficacy in Freshman Orientation: What predicts differences in confidence? Megan A. Haley (Dr. Jorie Edwards and Dr. Jared Edwards) Department of Psychology

This study was designed to explore Career Decision Self-Efficacy of first semester college students in order to understand and more effectively serve university students' career development process. This study was based on the ideas of Social Cognitive Career Theory (Lent, Brown, & Hackett, 1994) and the work on Career Decision Self-Efficacy of Betz and associates (Betz & Klein, 1996; Betz, Hammond, & Multon, 2005; Betz & Klein, 2006).

Students in freshman orientation complete the Career Decision Self-Efficacy Scale and provided demographic information. Multiple main effects and interactions of demographic variables on reported self-efficacy were shown. This demonstrates the complexity of career development while also providing

potential guidance for future career interventions in freshman orientation.

49. **U.S. Need for Tritium Production and the Impacts Thereof: Analysis of the “Environmental Impact Statement for the Production of Tritium in a Commercial Light Water Reactor” (DOE EIS-0288).** Louise Esjornson (Dr. Sylvia Esjornson) Department of Chemistry and Physics

The United States and Russia have always had a tenuous relationship. Out of this relationship has come attempts (some successful and some failed) to reduce the global nuclear stockpile; at the same time, both countries want their own weapons to function as deterrents. Tritium is required for building and maintaining nuclear weapons; however, it decays about 5.5 percent per year so tritium is in constant demand. Decommissioned warheads and their ilk provide some recycled tritium, but this is a finite source and the rate of decommissioning is hard to predict due to the nature of US/Russian relations. In the United States, tritium is made by putting Tritium-Producing Burnable Absorber Rods (TPBARs) into Commercial Light Water Reactors (CLWR). In 1999, an Environmental Impact Statement (EIS) estimated the impacts of putting TPBARs into CLWRs. Tritium was produced for several years and the tritium was found to be leaking into the cooling water faster than projected by the EIS. Due to this, a Notice of Intent to Prepare a Supplemental EIS was issued in 2011. The SEIS will examine whether the difference in tritium permutation is significant, and what alterations (if any) should be made to current and future tritium production.

50. **Environmental Impact Process of the Mohave County Wind Farm Project: Analysis of the Record of Decision (Bureau of Reclamation ROD Number LC 13-31).** Brandon J. Graham (Dr. Sylvia Esjornson) Department of Chemistry and Physics

BP, sometimes referred to by its former name British Petroleum, has recently expanded into the wind energy market. The environmental impacts of wind energy projects must be considered before placing wind turbines. The Mohave County Wind Farm Project provides an example of the Environmental Impact process that takes place during a wind energy project. When the Mohave County Wind Farm was proposed, there were five different alternatives that were considered and carried forward for analysis. BP had to comply with a number of different agencies while constructing the project, for example the Bureau of Land Management. In order to make a decision on which alternative to select for the construction process, many studies had to take place. In order to protect the bald eagles, condors, and bats that were living in the area of the project, efforts had to be taken to not disturb the natural habitat of these animals. Another issue that BP had to take into consideration was the presence of historical artifacts in the area. There is a history of Native Americans inhabiting the land that was proposed for construction of the wind turbines. The approval of BP's Mohave County Wind Farm Project is examined through the record of decision.

51. **Scientific Analysis of the Preparation of an Environmental Impact Statement and the Scoping Process for the Glades Reservoir Project.** Lon D. Ford (Dr. Sylvia Esjornson) Department of Chemistry and Physics

The population of Hall County, GA steadily increased over the past several years. The projected population of Hall County for the year 2060 is 833,333. To provide drinking water for the increasing population, a new Glades Reservoir has been proposed to the US Army Corps of Engineers (USACE). The application requests a Department of the Army Permit pursuant to Section 404 of the Clean Water Act for the discharge of dredged or fill material into the waters of the United States. The proposal describes a reservoir to be constructed 12 miles northeast of Gainesville, GA. The Glades Reservoir will pump water from the Chattahoochee River and Flat Creek. A minimal flow requirement has been established so that the river will not be damaged. The reservoir will provide 11.7 billion gallons of water storage and provide a safe yield of 72.5 million gallons per day, thereby providing drinking water for the projected population through the year 2060. A Notice of Intent to prepare an Environmental Impact Statement was published, and a 60-day scoping period occurred from February 17 to April 17, 2012. During the scoping process, comments were received discussing aspects of the project such as project purpose and need, water quantity and hydrology, mitigation and monitoring, alternatives, and cumulative effects. The next steps are to develop a federally approved Purpose and Need Statement, to identify alternatives that may accomplish the approved purpose and need, and to select the most appropriate alternative for full assessment of its environmental effects. Public hearings will occur during July and August of 2014. A Final Environmental Impact Statement will be submitted in December 2014, and the Final Record of Decision is expected in March of 2015.

52. **Analysis of regulatory attempts to save sea turtles from bycatch in the shrimp industry by using Turtle Excluder Devices (TED).** Cassidy J. Baker (Dr. Sylvia Esjornson) Department of Chemistry and Physics

National Oceanic and Atmospheric Administration (NOAA) is attempting to conserve sea turtles by regulating accidental catch of the endangered and threatened sea turtles species. There are seven species of sea turtles; six are found in the Gulf of Mexico and the South Atlantic Ocean. The six species of turtles found in the US consist of Green, Hawksbill, Kemp's Ridley, Leatherback, Loggerhead, and Olive Ridley. The seventh species, the Flatback sea turtle, is found in Australia. The six turtle species that are found in the US are endangered. The reason why they are endangered is the turtles are getting caught in the nets of shrimp fisherman and are drowning in the water due to not being able to get out of the nets to come to the surface to breathe. The accidental catch of these turtles is called Bycatch. The first attempt at sea turtle conservation was to have limits on the time the nets are in the water as well as to restrict the areas that can be fished at certain times of the year and times of day. The second attempt is to require shrimp fisherman to include Turtle Excluder Devices (TED) in their nets so that the turtles have a way to get out of the net if caught. The proposed rule to require shrimp trawlers to include TEDs in all of their nets was withdrawn after a study was done for the Draft Environmental Impact Statement (DEIS) and the TEDs were not as successful as anticipated. They worked well for the larger turtles but the smaller turtles were just swimming right through them into the nets and drowning. Observers with special training that are certified by the National Marine Fisheries Service are needed to obtain information to ensure the rules are working as anticipated, therefore sea turtle observation continues.

53. **Analysis of the Record of Decision by the U.S. National Nuclear Security Administration to continue Research and Development of Plutonium, Uranium, and High Explosives at National Laboratories.** William R. Davis (Dr. Sylvia Esjornson) Department of Chemistry and Physics

The National Nuclear Security Administration (NNSA) issued a Record of Decision on October 24, 2008 for the continued research and development (RD) and testing of plutonium, uranium, and high explosives (HE) at three separate government facilities and for the construction of new buildings at two of these sites. The decision involves keeping plutonium operations of nuclear weapons and RD at Los Alamos National Laboratory (LANL) in New Mexico. Continued uranium operations and RD will remain at the Y-12 National Security Complex in Tennessee. Assembly and disassembly of HE will remain at Pantex Plant in Amarillo, Texas. A new Chemistry and Metallurgy Replacement Research-Nuclear Facility will replace the older one at LANL. The second building is a new Uranium Processing Facility at Y-12. The five NNSA risk factors considered were engineering and construction, implementation, program goals, safety and regulation, and security. Other factors taken into account were land use, infrastructure, air quality, water resources, socioeconomics, and health and safety. Alternatives considered were to consolidate laboratories, change curators, and to redesign weapons to require less or no plutonium. A No Net Production Alternative, identified as the most environmental friendly, was not selected because termination of facilities would take away many jobs and cost too much money for facility clean-up. The No Action Alternative was unacceptable because it required continued operations at facilities that are outdated and too costly to operate. Written comments, many from environmental groups and peace organizations, were submitted for NNSA's consideration. Most comments spoke out against the decision for continued operations of facilities and against construction of the new facilities.

54. **Analysis of the Environmental Impact Process for Federally-funded Sport Fish Restoration by the California Department of Fish and Game Fish Hatchery and Stocking Program.** Allen Shane McGlothlin (Dr. Sylvia Esjornson) Department of Chemistry and Physics

Under the Sport Fish Restoration Act (SFRA), the U.S. Fish and Wildlife Service (FWS) is authorized to provide federal funds for actions associated with California Department of Fish and Game's Fish Hatchery and Stocking Program, which will provide freshwater angling opportunities and recreation throughout the state of California. Due to the state of California's acceptance of the federal funds, the environmental impacts of this stocking process need to be thoroughly examined before planting both native and nonnative species of fish into inland waters. The California Department of Fish and Game's (CDFG) Hatchery and Stocking Program provides a good example of the environmental impacts that can arise during a multi-species stocking and hatchery program. Four different alternatives were considered and carried onto the analysis process in relation to the CDFG Fish Hatchery and Stocking Program. In order to make a decision as to which alternative to select, many different studies had to be completed and mitigating actions applied in some instances to protect water quality, check the spread of invasive species and pathogens, and manage ground water. Because of the proposed impact to the local amphibian and

native fish populations, a very select group of fish was allowed to be stocked into the California waters. These fish include 6 trout species (Rainbow, Golden, Cutthroat, Brown, Lake, and Brook), and 3 salmon species (Chinook, Coho, and Kokanee). The approval of the CDFG Fish Hatchery and Stocking Program is examined through the record of decision.

55. Analysis of the Process of Preparing a Comprehensive Conservation Plan for National Wildlife Refuges. Lindsay E. Dusin (Dr. Sylvia Esjornson) Department of Chemistry and Physics

Wildlife Refuges are being examined by the U.S. Fish and Wildlife Service and Comprehensive Conservation Plans are being formed by this agency. A Comprehensive Conservation Plan is a document that outlines and guides long-term management for a National Wildlife Refuge. The U.S. Fish and Wildlife Service is responsible for conserving, protecting, and enhancing fish and wildlife and their habitats for the continuing benefit of the American people. Making Federal wildlife laws, managing migratory bird populations, restoring fisheries, administering the Endangered Species Act, and conserving and restoring wildlife habitat are the jobs of the U.S. Fish and Wildlife Service. When the U.S. Fish and Wildlife Service prepares their Comprehensive Conservation Plans, they go through a process that involves a notice of intent, an Environmental Assessment, and scoping process that details what their plans are for that wildlife refuge for the next 15 years. The public is involved in the process by proposing alternatives and submitting comments. The U.S. Fish and Wildlife Service decides on which alternative is the preferred alternative and which alternative is the environmentally preferred alternative. The national wildlife refuge system is the only existing system of federally owned lands managed chiefly for the conservation of wildlife.

56. Analysis of a petition to exempt genetically modified sugar beets from regulation under The Animal and Plant Health Inspection Service requirements. Vyctoria S. Gray (Dr. Sylvia Esjornson) Department of Chemistry and Physics

The Monsanto Company along with Klien Wanzlebener Saatzzucht, a seed breeding company from Klien Wanzleben village (KWS SAAT AG), petitioned The Animal and Plant Health Inspection Service (APHIS), of the United States Department of Agriculture, for their genetically modified sugar beets to reach a non-regulated status; therefore, the companies would have control of the sugar beets and no longer require authorization from APHIS. The genetically modified sugar beets, designated as event H7-1, were inserted with a gene for the enzyme 5-enolpyruvylshikimate-3-phosphate synthase (EPSPS) to make them glyphosate tolerant. An organism is no longer subject to regulatory requirements of 7 CFR Part 340 when it is demonstrated not to present a plant pest risk. If APHIS decides that the regulated article is doubtful to produce a greater plant pest risk than the unmodified organism, then APHIS authorizations would no longer be obligatory for field testing, importation, or interstate movement of the non-regulated article or its offspring. In the end, APHIS evaluation concluded in a finding of no significant impact (FONSI) for the sugar beets event H7-1 to present a plant pest risk.

57. Analysis of Environmental Impacts of Heap Leach Processing and Yellowcake Production for Uranium Recovery from the Lower Gas Hills of Wyoming. Gordon L. Perry (Dr. Sylvia Esjornson) Department of Chemistry and Physics

In November, 2012 Strathmore Corporation submitted a Preliminary Plan of Operations in accordance with the Bureau of Land Management (BLM) surface management regulations at 43 CFR part 3809 to develop a conventional heap leach recovery and mining operation to extract uranium ore from four separate mine units over an estimated project life of 12 years. Uranium recovery will be performed on-site using heap leach methods. A processing facility will produce yellowcake (uranium oxide, U₃O₈). New surface disturbance will include approximately 2,000 total acres for the four units. Surface disturbance will depend on the uranium production rate and the availability of mine construction equipment and personnel. The BLM has identified the following preliminary issues: potential effects to air and water quality; potential effects of uranium mining and production on surface resources including vegetation, soil, wildlife habitat and livestock grazing; and concerns about risks from radioactive or other hazardous elements. As part of the permitting process, the Nuclear Regulatory Commission must analyze potential impacts from granting of surface use authorization for milling and waste disposal operations in addition to the environmental impact analysis. The project is expected to provide an economic benefit through a variety of taxes paid to Federal, State, and local governments including employee income taxes, severance taxes, property taxes, and sales taxes. After completion of the project, the surface will be returned to its use of livestock grazing and wildlife habitat.

58. **Analysis of the EIS of the Long-Term Management and Storage of Elemental Mercury.** Shawn C. Hughes (Dr. Sylvia Esjornson) Department of Chemistry and Physics

In 2008 the United States Government passed the Mercury Export Ban Act. Within the confines of this ban the Department of Energy was directed to determine a facility for the long-term management and storage of elemental mercury that is generated and used within the United States. The DOE has set up parameters to follow the Solid Waste Disposal Act for a facility that has the capacity to store up to 11,000 tons of elemental mercury. During the process of this EIS the DOE analyzed the potential environmental, human health, and socioeconomic impacts of elemental mercury storage at seven different locations in Colorado, Washington, Nevada, Idaho, Kansas, Missouri, and South Carolina. Out of several locations the three locations for the mercury waste to be stored were located near the WIPP located in Carlsbad, New Mexico. Within this EIS the DOE decided two major factors: where to locate the elemental mercury storage facility, and whether to use an existing building, new building, or a combination of the two.

The prevention on the export of elemental mercury went into effect in 2013, January 1 in the effect to meet the requirements of the Mercury Export Ban Act of 2008. In August of 2013 seven waste management companies contacted the Department of Energy of their intent to store elemental mercury at the permitted facilities in accordance with the new law section 5(g)(2)(B). Now the DOE has designated a facility and is ready to accept elemental mercury for long-term management and storage, similar notifications can be received by the DOE from other waste management companies.

59. **Geologic Repository for the Disposal of Nuclear Fuel and Radioactive Waste.** Nick A. Reyes (Dr. Sylvia Esjornson) Department of Chemistry and Physics

The Geologic Repository at Yucca Mountain located in southeast Nevada, is intended to dispose of nuclear fuel and high level radioactive waste (uranium and plutonium oxides). The application of the site is to construct, operate, monitor, and eventually close the repository. The Repository's intention is to discard of spent nuclear fuel and radioactive waste that will be generated at 72 commercial and 5 Department of Energy sites across the United States as well waste currently in storage. There are many projected impacts on the Yucca mountain environment. Potential long-term impacts include the disposal of spent nuclear fuel and highly radioactive waste, the quality of the air in the Yucca Mountain region and the area's climatic conditions, the surface and groundwater features in the region and quality of the water, the environmental conditions along the proposed transportation corridors in Nevada and across the United States that Department of Energy could use to ship spent nuclear fuel and high level radioactive waste to the Yucca Mountain site. Also, the Native American Tribes in the surrounding area who have ancient ties to the land and Yucca Mountain, and whose primary focus has been the protection of cultural resources and environmental restoration at Yucca Mountain.

60. **Synthesis and Characterization of Pyridine-Armed Reinforced Macrocycles and Their Transition Metal Complexes as Potential Oxidation Catalysts.** Anthony D. Shircliff, Donald G. Jones, Kevin R. Wilson, and Desiray J. Cannon-Smith (Dr. Tim Hubin) Department of Chemistry and Physics

Oxidation catalysts stable in aqueous solution under both harsh pH's and at high temperature would be environmentally friendly alternatives to current technologies. Transition metal complexes of tetraazamacrocycles reinforced with additional ethylene bridges have produced such oxidation catalysts. A controlling aspect of the usefulness of any metal catalyst is its set of oxidation and reduction potentials. Reversible redox processes that bracket a potential window within which useful oxidation of substrate molecules can occur are desirable. Though quite robust, and exhibiting reversible electrochemistry, some reinforced macrocycle complexes are not useful catalysts because their redox potentials are not in a desired potential range. An established method of modifying the electrochemical properties of a transition metal complex is to modify the ligand, which subsequently modifies the properties of its complexed metal ion. We wished to determine if the addition of pyridine pendant arms to the known reinforced macrocycle ligands would result in beneficial shifts in the redox potentials of their transition metal complexes. The resulting ligands must allow at least one open coordination site on the bound metal ion for oxidant and/or substrate binding. We have synthesized and characterized both cross-bridged and side-bridged cyclen and cyclam tetraazamacrocycles with pyridine pendant arms. Manganese, iron, cobalt, nickel, copper, and zinc complexes were made. The synthesis and characterization of the ligands and the synthesis, electrochemistry, and other characterization of their complexes will be presented.

61. **New Cross-Bridged Cyclen Ligands and Their Transition Metal Complexes as CXCR4-Antagonists.** Ashlie Walker, Megan Ayala, and Justin G. Le (Dr. Tim Hubin) Department of Chemistry and Physics

CXCR4 chemokine receptors, together with their specific natural ligand, CXCL12, play a role in a number of disease states. We have developed efficient ethyl-bridged CXCR4 antagonists in prior work. Our objectives were to synthesize alternatively cross-bridged cyclen complexes and to characterize their chemical properties prior to determining if changing our typical ethyl-bridges to alternatively bridged macrocycles enhances the antagonism of CXCR4. Synthetic routes extending our cyclen-based ligand syntheses to use new cross-bridges were developed. Copper(II), nickel(II), cobalt(II), and zinc(II) complexes of single macrocycle dibenzyl and unsubstituted alternatively bridged cyclens were synthesized. Electrospray mass spectra, elemental analyses, and ¹H and ¹³C NMR spectra were collected to characterize the ligands and complexes. The ligand synthesis of the new cross-bridged ligands is more synthetically challenging than our typical ethyl cross-bridged versions. However, single-macrocycle ligands have been made. Complexation with the desired metal ions proceeded as expected. Characterization of the metal complexes is ongoing. Alternatively bridged tetraazamacrocycles are challenging to produce. Once synthesized, metal ion complexation proceeds smoothly following known procedures. The resulting complexes will inform our understanding of the requirements for producing even more efficient CXCR4 antagonists of this class.

62. **New Cross-Bridged Cyclam Ligands and Their Transition Metal Complexes as CXCR4-Antagonists.** Dustin J. Davilla, Shay L. Klassen, Brittany M. Epley, and Justin G. Le (Dr. Tim Hubin) Department of Chemistry and Physics

CXCR4 chemokine receptors, together with their specific natural ligand, CXCL12, play a role in a number of disease states. We have developed efficient ethyl-bridged cyclam CXCR4 antagonists in prior work. Our objectives were to synthesize alternatively cross-bridged bis-tetraazamacrocycle metal complexes and to characterize their chemical properties prior to determining if changing our typical ethyl-bridged to alternatively bridged macrocycles enhances the antagonism of CXCR4. Synthetic routes extending our bis-linked ligand syntheses to use alternatively-bridged macrocycles were developed. Copper(II), nickel(II), cobalt(II), and zinc(II) complexes of single macrocycle model ligands were synthesized, before attempting complexation with the bis-linked targets. Electrospray mass spectra, UV-Visible spectra, cyclic voltammograms, and ¹H and ¹³C NMR spectra were collected to characterize the complexes. The ligand syntheses of the new cross-bridged ligands is more synthetically challenging than our typical ethyl cross-bridged versions. However, single-macrocycle and bis-macrocycle ligands have been made. Complexation with the desired metal ions proceeded as expected. Characterization of the metal complexes is ongoing. Bis-linked alternatively-bridged tetraazamacrocycles are challenging to produce. Once synthesized, metal ion complexation proceeds smoothly following known procedures. The resulting complexes will inform our understanding of the requirements for producing even more efficient CXCR4 antagonists of this class.

63. **Transition Metal Complexes of Dimethyl and Dibenzyl Tetraazamacrocycles.** Megan Ayala and Ashlie Walker (Dr. Tim Hubin) Department of Chemistry and Physics

Tetraazamacrocycles, cyclic molecules with four nitrogen atoms, have long been known to produce highly stable transition metal complexes. Cross-bridging such molecules with 2-carbon chains has been shown to enhance the stability of these complexes even further, providing enough stability to use the resulting compounds in applications as diverse and demanding as aqueous, green oxidation catalysis all the way to drug molecules injected into humans. Although the stability of these compounds is believed to result from the increased rigidity and topological complexity imparted by the cross-bridge, there is insufficient experimental data to exclude other causes. In this study, standard organic and inorganic synthetic methods were used to produce unbridged dibenzyl tetraazamacrocycle analogues of known cross-bridged tetraazamacrocycles and their transition metal complexes to allow direct comparison of molecules identical except for the cross-bridge. The syntheses of the known tetraazamacrocycles and the novel transition metal complexes were successful with high yields and purity. Initial chemical characterization of the complexes by UV-Visible spectroscopy and cyclic voltammetry shows little difference in electronic properties from bridged versions. Direct comparison studies of the unbridged and bridged compounds' stabilities remain to be carried out and will shed light on the importance of the cross-bridge to complex robustness.

64. **Protein Engineering: Designing an Artificial Nuclease.** Jordan Thompson (Dr. Lori Gwyn) Department of Chemistry and Physics

Antibiotic resistance is a major global concern. Methicillin resistant *Staphylococcus aureus* (MRSA) strain USA300 causes ~97% of MRSA related skin infections. To alleviate this problem, nucleases can be

engineered to specifically attack genomes of antibiotic resistant bacteria, rendering them harmless. A nuclease is an enzyme that hydrolyzes phosphodiester bonds that are found in nucleic acid backbones. The repertoire of naturally occurring DNA related nucleases can be classified as specific or non-specific. Despite the ubiquity of these enzymes in nature, unique target sequences that are recognized by site-specific nucleases is limited. For this pilot project, the SaeR gene and the nuc gene were identified as targets in the MRSA strain USA300 due to their role in MRSA virulence. To design a nuclease, an extensive literature search was conducted of naturally occurring nucleases. The model nuclease Swal recognizes the sequence, 5'-ATTT₁AAAT-3', which naturally exists in the SaeR gene. In the design phase, the complete Swal gene was deconstructed into four smaller gene segments called JT1024A, JT1024B, JT1024C, and JT1024D. A variety of constructs were made from the gene segments: A+B, B+C, and C+D and cloned into pUC19 cloning vectors. Plasmids were purified, and subsequently sequenced. Future goals include protein expression and activity determination. The overall goal of this project is to study the process of efficiently engineering artificial nucleases.

65. **H57 Synchronizes Ammonia Passage in CTP Synthetase, Does Not Direct UTP Binding.** Matt R. Abbott (Dr. Jason L. Johnson) Department of Chemistry and Physics

CTP synthetase (CTPS) hydrolyzes glutamine and shuttles the resultant ammonia through an intermolecular tunnel to the point of incorporation into substrate UTP. Within the structure of CTPS, subunits were seen to exist in two equally populated conformers that varied in the position of the side chain of H57. In one conformation, H57 is poised to hydrogen bond with substrate UTP via its in-ring nitrogen and, in doing so, points away from the tunnel constriction; in the other conformation, H57 is pointed into the passage and would obstruct ammonia passage. Thus, H57 is proposed to act as a "swinging gate", synchronizing the passage of nascent ammonia with the availability of acceptor-substrate UTP. The role of H57 in the mechanism of CTPS was assessed by engineering and characterizing the protein variants H57A, H57N, H57L, and H57F. A range of residues was selected with varying side chain volumes and capacities for H-bonding with substrate UTP in the hope that trends in tunneling efficiencies and binding affinities (K_m) for UTP would provide mechanistic insight. All variants have been engineered, expressed, and purified. The kinetics of H57A have been fully characterized as a function of the allosteric activator GTP. Notably, the rate of CTP synthesis activity is markedly less than that of glutamine hydrolysis within H57A, giving rise to a tunneling efficiency of 0.020 ± 0.002 and 0.0066 ± 0.0008 in the absence and saturating presence of GTP, respectively. In short, the exchange of an imidazole ring for a methyl group at residue #57 dramatically uncouples the active sites, consistent with the role of H57 as a "swinging gate". The synchronization of active sites by H57 is hypothesized to result from its H-bonding interaction with substrate UTP, "opening the door" for nascent ammonia when acceptor-substrate is available. Such a mechanism would suggest contributions by H57 to the binding affinity of UTP; however, saturation profiles of UTP give rise to a K_m of 0.116 ± 0.024 mM for H57A, approximate to that of wild-type CTPS (0.188 ± 0.044 mM). Kinetic data for the remaining H57 variants is pending.

66. **In vitro Metabolic Stability Study of New Cyclen Based Antimalarial Drug Leads Using RP-HPLC and LC-MS/MS.** Anjali Shrestha and Apoorva V. Rudraraju (Dr. Faruk Khan) Department of Pharmaceutical Sciences

Metabolic stability of the new antimalarial drug leads is determined using human liver microsome (HLM) and specific cytochrome P450 enzyme (CYP2C8) taking the clinically used antimalarial drug chloroquine as a positive control. All the assays were conducted in 0.5M phosphate buffer at pH 7.4. Experiment is done using human liver microsome and then with specific enzyme CYP2C8 following standard methods. In general the metabolic reaction was initiated by adding 1mM NADPH. Incubations were done with increasing time ($t = 0$ hr, 1hr, 2hrs) at 37°C and the reactions were terminated by adding acetonitrile in the equal amounts of the assay mixture taken. The samples were centrifuged for 15mins at 10,000x g at 4°C and an aliquot of the supernatant was subjected to analysis using HPLC as well as LC-MS to confirm the masses of the drug and/or metabolite(s), if any. While chloroquine was found to be metabolized in a predictable manner by both HLM and CYP2C8, the drug leads were metabolically stable at similar experimental conditions. This study demonstrated that the new drug leads are worth conducting further preclinical evaluations.

67. **Determination of Log P values of New Cyclen Based Antimalarial Drug Leads Using RP-HPLC.** Apoorva V. Rudraraju and Mohammad F. Hossain (Dr. Faruk Khan) Department of Pharmaceutical Sciences

The main purpose of this study is to determine the log P values of drug leads using high performance

liquid chromatography. The main objective is to provide a standard calibration curve between parameters of the lipophilicity that is logarithm of retention coefficient (log k) and partition coefficient (log P) values using a series of reference standards which helps to determine the partition coefficient of the new drug leads. The reference standards with varying polarity ranges were dissolved in methanol and analyzed by RP-HPLC. The HPLC analyses were performed using C18 column and the mobile phase consisted of a mixture of water, acetonitrile and methanol in a gradient elution mode. A calibration curve is plotted between the experimental log P values and obtained log K values of the test compounds to get a best fit line. The log K values of the new drug leads determined in the same solvent system were used to calculate the respective log P values by using the best fit equation in Excel™. From the calibration curve, we obtained a coefficient of determination (R²) as 0.9768 and the adjusted R² as 0.9541. The P values of the intercept and slope were found to be 0.000258 and 3.83E-06 respectively at 0.05 level of significance and 95% confidence interval. Log P values of the new drug leads A, B, C, D, and, E were 7.546, 5.574, 5.546, 3.494, and 5.506, respectively. The estimated log P values of the drug leads by HPLC were closely related to the clog P values using ChemDraw Ultra 12.0. The obtained standard curve from the test compounds can be used as a reference for determination of lipophilicities of new drugs.

68. Novel Cyclen Based Antimalarial Agent: In Vitro And In Vivo Studies. Varun Reddy Nagireddy and Prabhjyot S. Saluja (Dr. Faruk Khan) Department of Pharmaceutical Sciences

Purpose: Besides the vulnerability of the US military to malaria, the disease represents a major geographic health burden in > 90 countries causing >500 million cases and killing about 1-3 million people each year. The main objective of this project is to develop novel cyclen based antimalarial drug. We have previously shown that 4,10-bis(7-chloroquinoline)-cyclen is a potent antimalarial drugs both in vitro (against Plasmodium falciparum) and in vivo (against P. berghei) (Khan et al. 2009. Antimicrob Agents Chemother. 53(4), 1320-1324). In the present study we have conducted further in vitro and in vivo evaluations including metabolic stability and single dose curative studies of the most potent drug candidate. Method: In vitro metabolism studies on the lead cyclen analog using liver microsomes containing CYP enzymes was conducted by HPLC method. The single dose curative study was conducted over 28 days period at 50, 100 and 200 mg doses in mice model. Results: We have previously shown that the compound possesses in vivo activity comparable to chloroquine. It was also shown to act by inhibition of hemozoin formation. In the present study we demonstrate that the candidate drug showed considerable stability up to two hours in liver microsomes under the experimental conditions utilized. In the single dose curative study, at 200mg dose all 5 mice survived until day 28 and exhibited 100% suppression of parasitemia; however, after 28 days all of the 5 mice died. Conclusion: The in vitro and in vivo studies correlated well showing reasonable metabolic stability and survival of the mice up to 28 days. The failure to cure the mice completely was possibly due to suboptimal dosage. An attempt to increase the dose to 300 mg was encountered with a solubility problem. Converting the drug into its hydrochloride salt in order to enhance solubility and thus to enable a single dose curative study using ≥300 mg is the next logical step to examine both curative and possible toxicity.

69. Macrocyclic Polyamine Derivatives and Their Metal Complexes as Antileishmanial Leads. Rosemary Omlin and Eunice Nwokocha (Dr. Faruk Khan) Department of Pharmaceutical Sciences

Purpose: Leishmaniasis, a vector born parasitic disease, affects more than 12 million people worldwide. The currently available drugs for treatment of leishmaniasis are severely toxic and not effective. The enzymes associated with the pathway of polyamine biosynthesis and transports are promising targets for new antileishmanial drug discovery. Intrigued by these facts we prepared a series of macrocyclic polyamines and their metal complexes and screened them against L. donovani, the causative agent for visceral leishmaniasis. Methods: Diaryl-monocyclic polyamines, monoaryl-monocyclic polyamines, monoaryl-bis-cyclic polyamines, triaryl-bis-cyclic polyamine and monoaryl-tris-cyclic polyamines were prepared employing standard procedures. The compounds were screened in vitro against the promastigote forms employing the alamarBlue assay. Pentamidine and amphotericin B were tested as standard drugs. Results: In general the diaryl-monocyclic polyamine derivatives were more active compared to the monoaryl-bis-cyclic and monoaryl-monocyclic derivatives. The analogs with metal complexes were in general less potent compared to the corresponding free ligands except the Fe-complexes, which were about 1.5-2-fold more potent than the corresponding free ligands. The Fe-complex NS08, a diaryl-monocyclic polyamine derivative, was found to be the most potent analog with antileishmanial activity comparable to pentamidine, the standard antileishmanial drug (IC₅₀ 1.71 µg/ml for NS08 vs. 1.61 µg/ml for pentamidine). None of the compounds showed cytotoxicity against African green monkey kidney (Vero) cells. Conclusion: The results indicate that the macrocyclic polyamine ring systems are prerequisites for the antileishmanial activity of these compounds. The analogs with hydrophobic aryl

ring showed higher antileishmanial potency, possibly due to improved cell permeability of these analogs. The improvement in the inhibitory potency by the Fe-complex may underpin the role of oxygen radicals formed by the redox cycling of ionic iron. Further studies to understand their mechanism of action as well as to get the analogs with improved antileishmanial activity are in progress.

70. Antimalarial Activity of Metal Complexes of Cross-bridged Tetraazamacrocyclic Ligands. John Eze Izuchukwu and Joshua VanTuyl (Dr. Faruk Khan) Department of Pharmaceutical Sciences

Purpose: The compounds with metal complexes have shown promising antimalarial properties. Recent discovery of antimalarial cyclen analogs at our lab prompted us to synthesize and examine the antimalarial activity of several new metal complexes with cross-bridged and side-bridged tetraazamacrocyclic ligands namely, cyclen and cyclam – analogs with benzyl groups. **Method:** The compounds were screened for in vitro antimalarial activity against W2 (chloroquine resistant) and D6 (chloroquine sensitive) strains of *Plasmodium falciparum*. The selectivity index (SI) of antimalarial activity of these compounds and in vitro cytotoxicity to mammalian cells were also determined. **Results:** The free ligands tested showed little to no antimalarial activity. The manganese complex of dibenzyl cross-bridged cyclam based ligands exhibited very potent antimalarial activity with IC50s of 67.4 and 83.8 ng/ml against the D6 and W2 strains of *P. falciparum* strains, respectively. The iron complex of this same ligand displayed IC50s of 227.1 and 172.6 ng/ml against the D6 and W2 strains, respectively. The manganese complex of the dibenzyl cross-bridged cyclen ligand displayed IC50s of 274.4 and 133.7 ng/ml against the D6 and W2 strain respectively. The copper complex of this ligand exhibited a much better antimalarial activity than the iron complex whereas the Zn, Ni, and Co complexes were mostly inactive. **Conclusions:** The bisbenzyl hydrophobic ligands showed better antimalarial activity possibly because of their better cell penetration ability. The higher antimalarial activity displayed by the manganese complex for the cyclam ligand in comparison to that of the cyclen underpins the larger pocket of cyclam compared to that of cyclen to produce more stable complex with the Mn²⁺. Some of the Cu and Fe complexes also showed improvement in activity but Ni, Co and Zn complexes were not very intriguing for antimalarial development.

71. Angiotensin II increases TRPV4 localization to plasma membrane in hypothalamic neuronal cell line 4B: implications for water and electrolyte homeostasis. Nile D. McCullough (Dr. Thomas Cunningham¹ and Dr. Andrea Holgado²) Department of Integrative Physiology and Anatomy, University of North Texas Health Science Center¹; Department of Biological Sciences, Southwestern Oklahoma State University².

Background: Renin-angiotensin system (RAS) plays a crucial role in regulating fluid and electrolyte homeostasis. Vasopressin (AVP), acts on the kidney by increasing water reabsorption. The syndrome of inappropriate vasopressin release is associated with excessive water retention. The molecular mechanism underlying this disorder remains unknown.

Purpose: The osmosensitive transient receptor potential vanilloid type 4 (TRPV4) channel is a cation channel that is activated by stretch. We used a rat ligated rat model to demonstrate that TRPV4 protein expression and membrane trafficking is increased in AVP neurons. Using calcium sensitive dye, we noted an increased magnitude in calcium transients in response to TRPV4 agonist, GSK1016790A post-Ang II (100nM) incubation, in vitro.

Methods: We used Western Blot technique to identify the effect of Ang II incubation on TRPV4 expression and cellular localization. The 4B cells were grown out in a Hyclone custom media DME/Ham's F12 1:1. The cells were treated for 1 hour with 100nM Ang II. Then, the cells were lysed using RIPA buffer and subjected to Western Blot analysis.

Results: The Western Blot technique proved that TRPV4 content in the plasma membrane increases after Ang II treatment.

Conclusion: We conclude that Ang II could regulate osmosensitivity by trafficking TRPV4 to the plasma membrane in hypothalamic neurons and may play a role in water and electrolyte homeostasis and dysregulation.

72. Using Optogenetics to Study Exocytosis in C. elegans Motor Neurons. Wil A. Markus and Elizabeth A. St. John (Dr. Andrea Holgado) Department of Biological Sciences

Synaptic vesicle exocytosis is a process in which neurotransmitters are released from vesicles in a presynaptic terminal into the synaptic cleft. Fusion of the filled vesicles is made possible by SNARE proteins. The vesicular SNARE protein synaptobrevin interacts with the target membrane SNARE proteins, syntaxin and SNAP-25, creating a SNARE complex, commencing vesicle fusion.

Neurotransmitters like GABA and ACh are conserved in the motor-nervous system of humans to *C. elegans*. Thus, understanding their release properties and regulation is crucial for motor function knowledge in normal conditions and pathological disorders. Utilizing the model organism *C. elegans*, we propose to study the rate of synaptic vesicle exocytosis via optogenetics, as well as ascertain their regulatory mechanisms. To do so, a plasmid was created that includes a region of genes that will express a pH sensitive, red fluorescent protein called pH Tomato, as well as regulatory sequences that drive expression in cholinergic or GABAergic neurons. The plasmid also contains sequences coding for the amino terminus and transmembrane domain of synaptobrevin, a synaptic vesicle resident protein that targets the fused pH Tomato to exocytic vesicles. Currently, the modular plasmid has been made and sequenced. Future plans include microinjecting the plasmid into our model organism, and monitoring the rate of vesicle fusion in both wild type and mutant animals that could have deficiencies in their rate of exocytosis.

73. Generating *Caenorhabditis elegans* UNC-33 Antigens to be Used for the Synthesis of Polyclonal Antibodies. Mason R. Howe (Dr. Andrea Holgado) Department of Biological Sciences

UNC-33, the *C. elegans* homolog of the collapsin response mediator protein-2 (CRMP2), has been demonstrated to be involved in neurodegenerative disorders, primarily Alzheimer's disease. However, the physiology and interactions of these associations are vague. In order to further understand UNC-33, our group decided to use molecular biology and work toward the production of polyclonal antibodies specific to UNC-33. To do this, we first produced plasmids by incorporating the nucleotide sequences for the UNC-33 into the GST tag Gene Fusion System. Next, began with the production of two antigens UNC-33 amino acid 48 to 212 and UNC-33 amino acid 48 to 131 (UNC-3348-212 and UNC-3348-131). During this process, we developed the parameters of an efficient protocol for the expression and purification of these polypeptides. Once we established an effective protocol, we performed numerous batches of expression and purification, and tested the purity of GST fused UNC-3348-212 and UNC-3348-131. Overall, these procedures resulted in the production of 1.24 mg/mL and 0.84 mg/mL of GST fused to UNC-3348-212 and GST fused to UNC-3348-131, respectively. Currently, these purified polypeptides are being injected into laboratory animals for the generation of polyclonal antibodies for two of the three UNC-33 isoforms. To complete our molecular toolkit, we are producing a third UNC-33 antigen that will detect all three UNC-33 isoforms furthering the knowledge of the UNC-33 protein family.

74. The Effect of Long-Term Diet-Induced Hyperglycemia and Hyperlipidemia on Oxidative Balance in Mouse Heart. Abby U. McKisson (Dr. Andrea Holgado) Department of Biological Sciences

Oxidative stress, a disruption in cellular oxidative balance, inhibits various cardiovascular functions including arteriogenesis (adaptive artery growth). Hyperglycemia and hyperlipidemia are associated with oxidative stress. Therefore, we studied gene expression of NADPH oxidases 2 and 4 (Nox2, Nox4) and heme oxygenase 1 (HO1) in hearts of C57BL/6 and Apo E ^{-/-} mice. These enzymes function as either antioxidants (HO1) or pro-oxidants (Nox2, Nox4). We hypothesized that hyperglycemia and hyperlipidemia changes the expression of these genes. To model hyperlipidemia and hyperglycemia, mice were fed either a high-fat diet (42% kcal) or a low-fat diet (13% kcal). After 6 months, hearts and blood were collected for analysis. Plasma insulin, glucose, and cholesterol assays confirmed high-fat diet-induced hyperglycemia, insulin resistance, and moderate hyperlipidemia in C57BL/6 mice, while ApoE^{-/-} mice displayed extreme hyperlipidemia without glucose intolerance. The high-fat diet sharply increased plasma isoprostane, demonstrating oxidative stress. Gene expression was analyzed using real-time RT-PCR, and normalized to b-actin. Nox2 mRNA tended to decrease with the high-fat diet (except in C57BL/6 females), although differences were non-significant. Nox4 was significantly decreased in ApoE^{-/-} males by the high-fat diet, but inconsistent results were obtained from the other groups. HO1 expression tended to be increased by the high-fat diet, although the trend was only significant in C57BL/6 females and was not observed in C57BL/6 males. Overall, the results suggest a possible compensatory response to oxidative stress. Measurement of enzyme protein levels may yield more conclusive results.

75. The Effect of LKE on Autophagic Gene Expression in *C. elegans*. Melissa N. Brewer (Dr. Andrea Holgado) Department of Biological Sciences

Many serious neurological disorders in the world, including Huntington's, Parkinson's, and Alzheimer's Disease, can be linked to unregulated autophagy. If a cure, or even a significant treatment, could be found for such neurological disorders, it would likely involve the genes associated with autophagic pathways. Recent research has indicated that a drug called Lanthionine Ketimine Ethyl Ester (LKE) has been shown to have positive neurological effects. LKE has been found to rescue cells that have been affected negatively by mutations, and more recently has shown positive effects in animals with an induced form of

Alzheimer's disease.^{1,2} These promising results reasons to study the effect of LKE on autophagy. With further research, it can be determined if LKE is an upregulator of the genes and if the drug affects the pathway directly. It can be hypothesized that LKE rescues autophagic genes and even upregulates non-affected genes. To test this theory we exposed *C. elegans* to either LKE or a control solution. Both groups were then harvested individually for RNA. The RNA was isolated, cDNA was produced, and finally the levels of expression of the selected autophagic genes were measured in both the test group and the control group. The experiment was repeated three times in order to ensure accuracy. The three tests produced variable results, and because of this variation we were unable to either confirm or reject our hypothesis. Further testing will be necessary in order to fully understand the effect of LKE on autophagy.

76. **Initial Steps towards Understanding the Role of Autophagy in Neurons.** Elizabeth Jansing, Timothy J. Stein, and Austin Bradshaw (Dr. Andrea Holgado) Department of Biological Sciences

Cellular autophagy or self-eating is an essential metabolic process by which cells recycle organelle's components and macromolecules. Research from animal models of Alzheimer's disease has shown that autophagy protects nerve cells from degeneration through a molecular mechanism that is not fully understood. To better understand the neuro-protective role of autophagy in the brain we began investigating LGG-1, a molecular marker of autophagy induction. Preliminary data obtained using *C. elegans* demonstrated that LGG-1 accumulates in cells with induced autophagy, suggesting that this protein could be used to monitor autophagy induction. Based on these studies we hypothesized that expression of LGG-1 in neurons will allow us to examine autophagy under normal and disease conditions. To test this hypothesis we began engineering a modular plasmid containing a neuronal promoter and the sequences of mCherry in frame with LGG-1. Thus far we have already obtained the mCherry sequence as well as the LGG-1. We will further continue by inserting these two sequences into the plasmids containing promoters for the expression in cholinergic and GABA-ergic neurons. Once these plasmids are produced they will be injected into *C. elegans* and autophagy induction will be investigated.

77. **Ethnomelittological Classification and Knowledge by a Mixtec Speaking Community of Guerrero, Mexico.** Timothy J. Stein (Dr. Victor Gonzalez) Department of Biological Sciences

In addition to being the most important pollinators of both wild and cultivated plants, bees are also deeply embedded in the cultural history of many societies. Archaeological and anthropological records indicate that bees were, and remain, an integral part of the cultural knowledge of many Indigenous peoples around the world. Using semistructured interviews as well as field surveys, we investigated the nomenclature, classification, and uses of native bees in Yoloxóchitl, a Mixtec speaking community in the municipality of San Luis Acatlán, along the Pacific Coast of the state of Guerrero, Mexico. Our consultants from Yoloxóchitl demonstrated extensive knowledge of the ecology and natural history of local bees. They classified them on a wide array of morphological, behavioral, nesting, and utilitarian features such as body color, aggressiveness, nesting habits and substrate, phenology, and the utility of their honey. Because they produce honey and wax, stingless bees (Apidae: Meliponini) are the most culturally significant bees for the Yoloxóchitl community, and apparently the Mixtec and other Mesoamerican societies as well. Stingless bee species recognized by Yoloxóchitl Mixtec for the most part correspond to currently accepted taxonomic concepts in bee systematics. In sum, data on the nomenclature, classification, and use of bees in Yoloxóchitl demonstrate the importance of incorporating Indigenous knowledge in scientific studies of bee diversity.

78. **Anatomical and morphometric variations in the arterial system of the domestic cat.** Anna C. Smith and Robert Cramer (Dr. Victor Gonzalez and Ms. Sue Ball) Department of Biological Sciences

We document the anatomical architecture and frequency of occurrence of variations in the branching pattern of the brachiocephalic artery and the origin of the internal iliac arteries in the domestic cat, a widely used model organism in both anatomical training and research. Based on the study of 56 preserved specimens, we observed three distinct arrangements in the branching pattern of the brachiocephalic artery. The most common pattern (52% of the examined specimens) was that in which the brachiocephalic artery was divided into two branches, the left common carotid artery and a common branch for the right subclavian artery and the right common carotid artery. The frequency of occurrence of each variation type was independent of the gender and body size. The internal iliac arteries originated posterior to the point at which the external iliac arteries branched off from the abdominal aorta. However, the portion of the abdominal aorta between the external and internal iliac arteries varied greatly in length and was not significantly correlated with its width, nor with body size or gender. This study is the first to report and quantify the occurrence of such variations in North American cats. Given the anatomical

similarity between the cat and other felids, the results of this study can be applied to other species, including endangered species.

79. **Medical Illustration: Gross Anatomy and the Beauty of Art.** Emily A. Baalman (Dr. Victor Gonzalez and Ms. Sue Ball) Department of Biological Sciences

Medical Illustration has been around for more than two millennia. It uses detailed illustrations of the human body to clarify structures and processes for medical and scientific purposes. Medical illustration combines the beauty of art with the precision and complexity of the medical field. It is considered a biomedical-communication career. Medical illustration requires an expertise in several fields, including art, biology, and communication. Herein, I present a sample of illustrations of the bones of the human body. To develop the illustrations, I used a traditional line drawing technique on a drafting paper combined with a computer-based editing and labeling approach (Adobe Photoshop and Illustrator). These illustrations will be used in a laboratory manual for SWOSU's Human Anatomy course.

80. **A Book About Bees.** Emily A. Baalman (Dr. Victor Gonzalez) Department of Biological Sciences

Scientific illustration artistically depicts scientific concepts and processes. It plays a pivotal role in education and outreach by making complex ideas easier to understand through visual representations. Here I present a sample of cartoon illustrations of different types of bees. These insects are the most important pollinators of both wild and cultivated plants. Bee populations are also rapidly declining worldwide. To create the illustrations, I used layered mixed media of ink drawing, watercolor, colored pencil, and computer-based editing (Adobe Photoshop). The art presented here will be used in a children's educational book about bees to promote understanding and conservation.

81. **Sugar Preference of the Fruit fly: *Drosophila melanogaster*.** Maryanne Dantzer-Kyer (Dr. Jimena Aracena) Department of Biological Sciences

The purpose of this research was to determine the feeding preference of *Drosophila*. Five different sugars were tested: sucrose, glucose, fructose, lactose, and mannose. Each test consisted of obtaining approximately 50 flies that had been starved for 20 hours, and then allowing them to feed, undisturbed, for one hour. The flies were placed in an "arena", a large covered, petri dish, along with a patch filled with equal amounts of two different sugar solutions. The solutions were dyed red and blue for later determining which sugar solution each individual consumed. The data collected from the experiments suggest that the sugar preference of *Drosophila* is sucrose.

82. **UVB radiation impacts growth rate differently in four freshwater, mat-forming algae.** Angie M. Hoover (Dr. Steven O'Neal) Department of Biological Sciences

UVB radiation (wavelength range 290-320nm) can have detrimental effects on various aquatic species including freshwater algae, due to its high energy and ability to penetrate the atmosphere. UVB can inhibit growth and reproduction, as well as lower levels of chlorophyll in photosynthetic organisms. This study considered the effects of UVB radiation on four species of algae: *Spirogyra* sp., *Zygnema* sp., *Pithophora* oedogonia, and *Mougeotia* sp. These four are filamentous in structure and form floating mats, making them especially vulnerable to intense sunlight and UVB radiation exposure. In this study the algae were pre-acclimated to either high visible light or low visible light for a week prior to being exposed to UVB radiation for a week. Growth rate and chlorophyll content for the UVB exposed algae were measured and statistically compared to controls not UVB exposed. Pre-acclimation to low visible light resulted in a UVB sensitive ranking (most to least sensitive) as follows: *Zygnema* > *Mougeotia* > *Pithophora* > *Spirogyra*. When pre-acclimated to high visible light the UVB sensitivity ranking for the algae was different: *Mougeotia* > *Spirogyra* > *Pithophora* > *Zygnema*. Growth rate of *Zygnema* sp. was strongly inhibited by the UVB radiation when pre-acclimated to low visible light, but was not significantly affected when pre-acclimated to high visible light. Only *Spirogyra* was more sensitive to UVB after being pre-acclimated to high visible light. The other algae all exhibited higher growth rates in the presence of UVB after being pre-acclimated to high visible light compared to their growth rate when low light acclimated. This suggests that high visible light exposure may trigger a UV protective mechanism in *Zygnema*, *Pithophora*, and *Mougeotia* but not *Spirogyra*. Further investigation would determine whether these three algae produce UVB absorbing protective compounds.

83. **Mapping Avall and PvuII restriction enzymes on pUC19 is affected by methylation.** Nicholas J. Whalen and Shasta A. Jones (Dr. Muatasem Ubeidat) Department of Biological Sciences

Mapping restriction enzymes on plasmids is a tool used by molecular biologist to design cloning strategies and probes in addition to many other useful purposes. These enzymes were isolated from bacteria and named according to the source. Bacteria use these enzymes to protect itself from foreign DNA that is either injected into the cell by viruses (transduction) or acquired from the environment or from other bacteria. The bacterium that is the source of the enzyme has methylase that adds methyl groups to the restriction site to prevent the enzyme from digesting its own restriction site in the bacterial genomic DNA. Methylated restriction enzyme sites cause problems if they are not known. In our principles of biology I lab, students learn mapping of Avall and PvuII restriction enzymes on pUC19 plasmid. They do so by digesting the plasmid with each enzyme separately and then both together (double digest). Based on the bands sizes, a map can be constructed. Over the years, pUC19 was purchased directly from New England BioLabs (NEB) without knowing if the preparation of the vector was performed in methylase negative (dam-/dcm-) or methylase positive bacteria. The double digest with both restriction enzymes showed a mixture of both a methylated and nonmethylated vector. This made the mapping very difficult to study and the map difficult for the students to construct. In our lab we are in the process of clarifying this and providing solutions for this problem.

84. **Targeting Mitotic Machinery for Therapeutic Cancer Treatment.** Jamin P. Brown¹ (Dr. Dean Dawson²) Department of Biological Sciences, Southwestern Oklahoma State University¹; Department of Cell Cycle and Cancer Biology, Oklahoma Medical Research Foundation²

The improper partitioning of chromosomes during cellular division is a deleterious event that leads to chromosome imbalances. Such imbalances define diseases like trisomy 21 in humans and are a common feature of tumor cells. Interestingly, the protein constituents that mediate chromosome segregation for ensuing division are often overexpressed in such tumor cells, rendering these modulators particularly appealing targets for therapeutic cancer treatments. One such protein is the conserved kinase Mps1, which is essential to the process by which chromosomes are correctly oriented and attached on the spindle for segregation. It is known that Mps1 regulates chromosome segregation by the phosphorylation of several target proteins, including Dam1, a component of the kinetochore to which spindle fibers attach. It is less clear, however, what role the phosphorylation of Dam1 by Mps1 serves in properly orienting chromosomes on the spindle. In characterizing this role, we imaged yeast cells expressing mutant forms of Dam1 incapable of being phosphorylated by Mps1 to determine if this regulation is necessary for promoting the proper segregation of chromosomes. In addition, we attempted to rescue the defective segregation of mps1 mutants by expressing in them forms of Dam1 mimicking an Mps1-phosphorylated state. Our results strongly suggest that Mps1 acts to orient chromosomes at least in part through Dam1. Ultimately, the identification of Dam1 as a functional target of Mps1 is important in providing a more complete understanding of how chromosomes are correctly segregated during cellular division and warrants further investigation into proteins phosphorylated by Mps1 as potential targets for therapeutic cancer treatment.

85. **The WUFI App: Development of tree survey software for the Weatherford Urban Forest Inventory.** Rachel Hurt (Mr. Jeff Walker¹ and Dr. Lisa Castle²) Department of Accounting, Computer Science, and Entrepreneurship¹; Department of Biological Sciences²

We are developing a mobile app that allows student surveyors to simultaneously collect location, image and tree health data for the trees of Weatherford. Student researchers have been monitoring an invasive tree (Tree of Heaven, *Ailanthus altissima*) and tree death for several years, but have noticed a lack of baseline data of tree presence and health. Combining information collected by different groups of researchers using different devices (cameras, GPS units and pencil and paper) has been troublesome. We are therefore developing an open-source, customizable Android-based application that will enable student researchers to inventory and monitor the urban forest of Weatherford.

86. **Do the cucumbers still squirt in a drought? Population fluctuations of squirting cucumber, *Cyclanthera dissecta*.** Alfa A. Abame (Dr. Lisa Castle) Department of Biological Sciences

Cyclanthera dissecta (Cucurbitaceae) is a weedy annual vine native to western Oklahoma. This species has been poorly studied, but is closely related to medicinal and edible species, including *Cyclanthera pedata* and agricultural weeds. We have tracked changes in a population of *Cyclanthera dissecta* near Weatherford, Oklahoma, for four years in order to determine baseline population size and effects of unusual weather conditions on this plant. We compare population size, average plant size, and average number of fruits per plant for the four seasons, and look at environmental factors, particularly drought and

early freezes, that may influence plant growth and survival.

87. Edible, Medicinal and At-Risk? Zella L. Classen (Dr. Lisa Castle) Department of Biological Sciences

Five plant species native to the United States were scored using the United Plant Savers' At-Risk Assessment Tool. The tool was originally created to help prioritize conservation efforts for wild-harvested medicinal plants. Here, we apply the tool to plant species that are most commonly used for food, but which may have healthful components as medicines or "functional foods". We rank these species based on their vulnerability to over-harvest and investigate the chemical constituents (phytochemicals) that have made them of interest in nutraceutical or pharmaceutical preparations.

88. Scoring Strange Plants: Service Learning in Plant Taxonomy Class. Dr. Lisa M. Castle, Department of Biological Sciences

Students in Plant Taxonomy (BIOL 4454) scored plants to determine their vulnerability to over-harvest using the United Plants Savers' At-Risk Assessment Tool. This project had both conservation and educational goals. The conservation goal was to help the United Plant Savers, a non-profit known for working with the herbal products industry to determine conservation strategies, expand the use and applicability of the new At-Risk Assessment Tool by scoring plants that had not previously been considered At-Risk. The educational goal was to increase students' knowledge and skills in working with botanical information.

89. Reading Speed Vs. Font Size. Brooke D. Battles (Ms. Jana Rowland) Biomedical Academy, Western Technology Center

The purpose of this experiment was to test reading speed based on three different font sizes. Thirty different high school individuals were tested; 15 females and 15 males. Each one read six paragraphs that had 120-124 words, and consisted of two of each font size. The individuals were told when to start and a stopwatch was used to time them in seconds. The individuals would indicate when they had finished the paragraph and their times would be recorded. Once all the data was collected, the average was taken of each font size. The results showed that no matter what the font size, females on average read faster than males. Also, it showed that the larger font size had the faster reading speeds than the smaller font sizes.

90. Music and Memorization. Lauren P. Russ (Ms. Jana Rowland) Biomedical Academy, Western Technology Center

The reason for running this experiment was to see how music affected your brain to memorize material. Does it have a positive or negative effect? Being that we live in such technological world music is always at our fingertips. People have stated that it is a very negative thing causing you to not fully concentrate. Well that might not be the case. This experiment will help us find out because I tested 27 students and divided them up in groups by different genre of music. I had a control group of no music and then I had a group that listened to country, a group that listened to rap, and a group that listened to classical. According to my results people scored better when listening to the upbeat rap music. This could be possibly because they really liked that genre therefore it helps them to really do well on the test. I think in the world we live in today we are used to being over stimulated therefore music does not have a negative effect on us.

91. Fertilizer: Is it Harming Your Pond's Ecosystem? Kendahl L. Camblin (Ms. Jana Rowland) Biomedical Academy, Western Technology Center

This study was conducted to determine how much fertilizer it takes to cause an effect on live microorganisms, snails and plants in a pond. Oklahoma is a huge agricultural state that deals with a lot of fertilizers. Fertilizers that are used on crops and yards contain nitrogen and phosphorus. Nitrogen and phosphorus have been reported in causing eutrophication in many pond and lakes and an excess algae growth. In this study, fertilizer of full strength was diluted into concentrations of 5%, 10%, 20%, 30% and 40%. Pond-dwelling organisms were added to a beaker and fertilizer concentrates were added accordingly. These were then observed at the beginning, 24 hours and 48 hours and recorded. Results revealed that all snails died when fertilizer concentration was 40%. Microorganisms (daphnia and mixed crustaceans) died when the concentration of fertilizer was at 10%. Elodea plants died at 10% fertilizer concentration, becoming detached and tan/brown. At much lower concentrations, live pond-dwelling organisms started to decrease.

92. **The Effects of Physical Stimulus on Teenager's Memory Capability.** Charles E. Spells (Ms. Jana Rowland) Biomedical Academy, Western Technology Center

The purpose for this experiment was to see the effects of a physical stimulus on memory of teenagers during the incubation period. Test subjects were given a memory test on 25 vocabulary words, and were either asked to sit or walk during the incubation period. The results show that physical stimulus had a negative effect on memory of boys of 3.31 average and girls of 1.81 average; there was also a higher rate of guessing among boys rather than girls. To conclude physical stimulus during incubation period has a negative effect on the memory of teenagers.

93. **Age Differences in Simple Reaction Time.** Jesse N. Velasco (Ms. Jana Rowland) Biomedical Academy, Western Technology Center

The purpose of this study was to find out whether the simple reaction time has a correlation to the human aging. The study was performed with the participation of 50 individuals selected randomly and grouped into five life stages respectively. The participants completed two different reaction time games; software activities found online. Both activities showed how fast the participant reacts by visual stimuli through a simple activity. After the faster individuals' response the computer recorded the average reaction time over five attempts and this result was reported and accumulated to get the mean of each group. These results indicate that young adults' men are faster than any other men stage or any age in female gender. Getting results from the test allowed us to improve knowledge about the impact and effects of age in many situations that requires reacting quickly to danger or any other circumstances of our daily life.

94. **Stretched and Applied Heat Comparison on Ankle Dorsiflexion.** Megan C. Foust (Ms. Jana Rowland) Biomedical Academy, Western Technology Center

The purpose of this study was to compare stretch verses applied heat to see if one or the other shows more of an increase of range of motion on the ankle dorsiflexion. A calf stretch was performed by 16 of the students and 15 students applied heat on the calf muscle. The sixth grade students, age 11-13, were measured to show improved ankle range of motion as a result of stretch or applied heat. As a result of the study, there was more of an increase on the applied heat measurement in degrees than the stretch measurement in degrees. The students who applied heat on their calf muscle had an overall increased measurement with 102 degrees than the students who performed the stretches that had an overall increase measurement of 33 degrees. Results indicated that applying heat will increase range of motion more than stretching.

95. **Methods of Making Ceramic Mold.** Ashley Renee Dobbs, Nicole Laitran, Austin Munson, and John Polcyn (Dr. Robin Jones and Dr. Siriporn Peters) Department of Art, Communication, and Theatre

Methods of making ceramic molds are generally tacit knowledge of art and design practices. The authors aim to articulate knowledge to the art and design community. We also intend to explain procedures, materials and how to make ceramic molds efficiently and effectively. This experimental research was conducted in Foundation III 3D Design Studio. The main goal was to investigate which would be the best procedure and material for making a two-piece plaster mold. Shapes of prototypes are the key consideration. Different materials for making a prototype and blocks for forming the ceramic mold will be discussed. The suggestions for the best practice and limitations are also included.

Podium Presentations

Please Note: The following oral presentations will begin at 12:30 PM in the Bonny Boardroom within the Student Union.

96. **"Voices of THE SCARLET LETTER".** Blaine A. Boyd (Dr. Viki Craig) Department of Language and Literature 12:30 PM

Prepared for Issues in American Lit, Fall 2013, this creative project replaced the regular exam format. It addresses research and reading about the Puritan period, especially the novel THE SCARLET LETTER, and also "Young Goodman Brown," in addition to readings from Cotton Mather, Samuel Sewall, Ann Bradstreet, Edward Taylor, Mary Rowlandson, and other historical documents. The student writer created a sequence of poems from four voices in Hawthorne's novel--Hester Prynne, her daughter Pearl, Arthur Dimmesdale, and Roger Chillingworth--with an eye to revealing the inner emotions and intimate views of these somewhat ambiguous, vague characters. This is an approach to assessment uniquely appropriate for literary works reported by a detached, third-person narrator. In this case, the poems reveal the particular conflicts, repressions, deep needs, and intense drive toward an elect condition/salvation of the Puritans. In the poem from Hester's point of view, she says, "I feel no shame for the weight on my breast / Or the weight in my arms," referring to baby Pearl. Dimmesdale is standing watching Hester and Pearl on the scaffolding as the community ridicules them, and he laments, "Those two are together / but there should be three." Roger Chillingworth, Hester's long-lost husband, presumed dead, watches the scene as well, thinking, "I was a ghost walking among men." Pearl, who has no memory of the event as a young child, yet feels the weight of the community's disapproval of her mother and her own existence, says, "They say my mother is sinful, / And I am her sin." The reader, through these voices, is allowed to become involved with the story that seems more report than anything else as Hawthorne delineates it.

97. **Navigating between Worlds: Sherman Alexie's PART-TIME INDIAN.** Veronica Ladd, Anastacia Speed, and Dr. Viki Craig, Department of Language and Literature 12:50 PM

Using the Prezi approach, the English Ed Methods professor and her student will present a modification of a lesson plan centering on Sherman Alexie's controversial novel, THE ABSOLUTELY TRUE DIARY OF A PART-TIME INDIAN. The focus will be negotiating conflict created by differing expectations of the young, in Alexie's novel, from familial and tribal sources, from the tribe and white society. The discussion will extend to young people in general desiring to escape from or to confront expectations of them keyed to gender, race, age, socio-economic status, etc. The presenters will explore cartooning, Sketch to Stretch composition strategy, and the concept of transmediation applied to the ELA classroom under Common Core guidelines. This presentation was previously made to OCTE, fall 2013, in OKC.

98. **Dreamscape.** Lori R. Webb (Dr. Viki Craig and Dr. Valerie Reimers) Department of Language and Literature 1:10 PM

This project, written for Writing Theory and Practice, was the result of an assignment to create life-writing. It turned into a "fictional" piece of writing based on a dream experience of the writer, and it is based on experiments in writing in a private manner and for the public. The author utilized exercises in dialogue-writing, literary portraiture (descriptive writing), narrative, poetry, and meditation. The story concerns two children, Alexa and Jack, who meet at seven and twelve years old respectively, when their single parents announce their intent to wed, thus requiring them to be part of a blended family. The various genres and facets of writing track the two children from early discomfort or outright hostility to a close and loving bond over time. A particular symbol, the daisy, plays a role in the transformation of their relationship. The included poem reveals on Jack's part a completely different, complicated new response to his acquired sibling. The author also reflects on the ease with which she can enter her private space of writing, losing all track of time and the need to meet regular obligations; the public writing aspect caused her to focus primarily on her readership and analyze from a very different perspective. While the resulting story is more fictional than not, because she was the dreamer, she is still observer in her own story. She will do a podium presentation of the story and share her reflection on the process.

99. **"The Diary of Pearl Prynne"--an Original Short Story Presentation.** Shannon N. Eidschink (Dr. Viki Craig) Department of Language and Literature 1:30 PM

The author wrote this short story as an alternate form of assessment for the Puritan unit and THE

SCARLET LETTER in her Issues in American Literature class, fall 2013. After reading Hawthorne's novel and a number of other Puritan literary works--poetry from Ann Bradstreet and Edward Taylor, journals and life writing from Cotton Mather, Samuel Sewall, and other prominent Puritan figures--the author decided to craft a fiction in which a 21st C. young woman time travels to Salem via a diary she finds in an attic trunk. She meets the writer of the diary, Hester Prynne's young daughter Pearl, who tells the young woman about the desperate condition of being shunned and reviled in the town of Salem. The writer combines much historical and literary research with a gift for fantasy fiction; she can use this story as a model in her teaching in ELA classrooms, or perhaps extend the tale and publish it.

100. **The Story-Box Project: An Intergenerational Community-Based Art Activity.** Ms. Joana Hyatt, Department of Art, Communications, and Theatre 1:50 PM

SWOSU art education students are currently taking a Research in Art Education course designed to inform, inspire, and create awareness about art projects that serve the community. By going out into the community of Weatherford, preservice art educators invited seniors to participate in making a story-box that was representative of a life event, a special person, or special skill or hobby. The art education students were assigned a senior partner from The Pioneer Center. Each student interviewed their partner gathering stories about the seniors lives. The seniors textual narratives were transformed into visual narratives with the help of the pre-service art education students. Through the process of creating art together, stereotypes about age were addressed. The seniors and the SWOSU art students began to understand they share a sense of community. Pre-service art education students discovered that the people in the community are cultural and historical resources in which to gain knowledge and a deeper appreciation about place-based arts and education. Facilitating community service projects that involve art, it is possible to bridge the divide between age differences, and create a sense of community through the arts.

101. **William Gilmore Simms Newfound Wanderlust in "Sharp Snaffles".** Parker M. Long (Dr. Kevin Collins) Department of Language and Literature 2:10 PM

American authors of the 20th century are known, perhaps more than anything else, for their sense of restlessness, for their equation of domesticity with boredom, for their equation of the road with possibility and excitement. The foremost examples of this phenomenon may be the Expatriate writers of the 1920s—most notably Hemingway—and the Beat writers of the 50's and 60's: Jack Kerouac, William Burroughs, and others. It is perhaps more than a coincidence that both of these periods followed historical events—World War I and World War II, respectively—that undermined the traditional American sense of self that had long been defined in large part, as it had in most of the world, by the sense of place, by the individual's relationship with his or her home. Nearly a century before the Beats, a half century before the Expatriates, American author William Gilmore Simms underwent a comparable transformation in terms of his literary relation with the concept of home, and for a comparable reason. Following a 30 year career during which he devoted much of his efforts to a glorification of the home, even in those works that enacted the effort merely to make a home, Simms's traumatic experiences during the Civil War brought about a dramatic change in his outlook. In a significant story published just after his death, "How Sharp Snaffles Got His Capital and Wife," Simms illustrates an alienation from the idea of home that is remarkably similar to the motivating ideas of the Expatriates and the Beats.

This paper will examine the contrast between the constraints of home and the freedom of the road in "Sharp Snaffles," it will contrast this new outlook with Simms's notions of home in works prior to the Civil War, and it will attempt to establish a relationship among American identity, trauma, an alienation from the home, and a fascination for the road that defines a great deal of the American character, a connection that American Expatriate and Beat writers would continue to pursue.

Performances

Please Note: The following performances will begin at 2:30pm at the North side of the Ballroom within the Student Union.

102. **Fanfare for Argestes**, by the SWOSU Trumpet Ensemble (Dr. Richard J. Tirk), Department of Music

The SWOSU Trumpet Ensemble is premiering Jackson Anderson's work 'Fanfare for Argestes' at the International Trumpet Conference in May. The piece was written for the ensemble and Jackson would discuss the challenges of writing a composition for this ensemble and the process he uses for composition.

Members of the SWOSU Trumpet Ensemble include: Bethany Peyton, Brittany Carter, Andrew Carlson, Jakub Chermack, Mikela Connella, Jacquie Cox, Austin Hardman, Benjamin King, Joaquin Martinez, Ryan Meek, Davison Nguyen, and Tommy Smith.

103. **Saudi Arabian Music**, by Mshal Almaqbal (Ms. Tee Kesnan and Dr. Denise Landrum-Geyer), Department of Language and Literature

The presenter will perform a piece of instrumental music from Saudi Arabia on a traditional Saudi Arabian instrument.

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