

**Eighteenth Annual  
Student Research and Scholarly Activity Fair  
Tuesday, April 12, 2011**

Welcome,

The researchers, sponsors, and University Research and Scholarly Activity Committee appreciate your attendance at the Fair. Many hours have been committed toward these projects, representing a diverse array of disciplines across SWOSU. The University Research and Scholarly Activity Committee congratulate these participants for their efforts. We trust that you will have an enjoyable day.

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 Blake Sonobe for their support for research and other scholarly activity at all levels throughout the University. Special thanks, also, to Dr. Lori Gwyn, Director of Sponsored Programs, and Ms. Berva Pool, Sponsored Programs Specialist, for their continuing efforts on behalf of the University Research and Scholarly Activity Committee. Thank you to Ms. Anjana Patel in the Website Management Department for her help in coordinating the online application process. Finally, to the members of the Committee, thank you for your dedication and hard work to make this event a reality.

Most of all, congratulations to all of the faculty, staff and administrative sponsors who dedicated significant time and effort toward integrating students into various areas of research and other forms of scholarly activity. The extra effort yields dividends for the future as students discover the excitement and fulfillment that research and scholarly pursuits can create.

Sincerely,



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

*Committee Members*

Dr. Arden Aspedon  
Dr. Muatasem Ubeidat  
Mr. Nolan Lawless

Mr. Jess Parker  
Ms. Xiaomiao Wang  
Dr. Lori Gwyn (Ex. Officio)

Dr. Rahmat Talukder  
Ms. Mary Lawless

## **Title, Presenter, (Sponsor), Department, Abstract**

1. **Fluorescent Light Bulbs.** Cory Pence, Mason Keck, and Jason Wallace (Mr. Jeff Short) Department of Industrial and Engineering Technology

This research is an investigation of the materials and processes involved in manufacturing compact fluorescent lamps (CFL). CFLs transcend incandescent light bulb designs by using several technology improvements. CFLs offer the same amount of lighting without using as much energy as incandescent light bulbs. Research indicates that CFLs are approximately 75% more efficient than standard bulbs. This research display will also aid in understanding how the bulb is produced from raw materials, distributed, consumed, and disposed using a product life cycle management model. There are five steps in transforming the product from raw materials to recycling. These steps are:

- 1) Raw Material Extraction
- 2) Manufacturing Production
- 3) Transportation
- 4) Utilization/Consumption
- 5) Disposal Recycling.

Other advantages of these bulbs are better lighting disbursement, less heat generation, and longer life. As energy efficiency and conservation become more important, standards for home products are being updated as well. Minimum energy efficiency standard regulations require products to meet specific energy efficiency requirements, these standards play a key role in the development of new lighting technology.

2. **LED Rope Lights.** Chad McIntosh, Jeremy Leatherwood, Dustin Covington, and Logan Howell (Mr. Jeff Short) Department of Industrial and Engineering Technology

This research addresses the manufacturing and distribution processes, from raw materials to the final customer, of rope lights. Rope lights are used for many occasions such as holidays, decorative (bars, pool houses, deck lighting), and are becoming an architectural option in new construction. Specifically, this research focuses on LED (light emitting diode) rope lighting. A basic LED rope light consists of PVC flex hose, wiring, power cord, power connector, end cap, and LEDs spaced from .5"- 1.0". A typical LED has an available luminous efficacy of 55 lumens per watt. For comparison, a conventional 60-100 W incandescent light bulb has a luminous efficacy of 10 lumens per watt. A Lumen is a measure of brightness; the higher lumen/W shows higher efficiency. The average rope light uses anywhere from .75 to .77 watts per foot whereas an incandescent rope light uses 6 to 8 watts per foot. Resources utilized include data from manufacturers and online sources to compile information about processes and raw materials. This research also addresses the distribution of rope lights from the plant to distributors and final customers.

3. **Astronomical Spectroscopy.** Wil Markus (Dr. Tony Stein and Dr. Wayne Trail) Department of Chemistry and Physics

Spectra are our primary source of information about stars and other objects beyond the reach of spacecraft. Stellar spectra can be used to determine a star's temperature, atmospheric content, radial velocity, mass, and more. Recently, for example, spectroscopic techniques have been successful in finding extrasolar planets through Doppler shifts in stellar spectra. In this work we present the spectra of a selection of stars of various spectral and luminosities classes, and we discuss some information those spectra provide. (This research was funded by a NASA grant through the Oklahoma Space Grant Consortium directed by Ms. Madeline Baugher.)

4. **Particle Mixing With Varying Sizes and Densities.** Micah Webb (Dr. Tony Stein) Department of Chemistry and Physics

Failures in mixing have posed many problems in certain industries. Often, these problems are solved by a trial and error approach. However, we are investigating the effects of size and density in barrel type mixers. Through the use of glue we can collect the particles being mixed as a whole piece and cut the whole into slice so we can analyze our data statistically to find trends of different materials being mixed. (Research funded by NASA research grant through the authorization of Madeline Baugher.)

5. **Adult Literacy Research Program Psychology.** Dr. Stephen Burgess, Department of Psychology

We will highlight the research being conducted in adult literacy by the Psychology Department Faculty with examples of current studies. Also will detail the potential for student involvement in the research process.

6. **Video Game Research Psychology Department.** Dr. Stephen Burgess, Department of Psychology

We will highlight the video game research program in the Psychology Department. We will present examples of current projects and detail opportunities for student involvement.

7. **P.A.C.E.D. Research Team.** Dr. Jared F. Edwards, Department of Psychology

The Psychology and Career Education and Development Research Team explores questions relevant to Vocational Psychology, Career Development, and Psychological Education with collaborative student-faculty interaction.

8. **Media Research in the Psychology Department.** Dr. Melinda Burgess, Department of Psychology

We will describe themes of research being investigated by the media research group in the Psychology Department. Opportunities for student involvement will also be presented.

9. **The Effects of Transracial Adoption on African American Children.** Katy Unruh, Kimberly Beight, and Ruth Francis (Dr. Meghan McGhee) Department of Social Science

Transracial adoption is a topic that has garnered much debate in the US for several decades. With increased racial integration in schools and the workplace, tensions have also risen in social service agencies. This issue especially effects the African American community, representing forty percent of all adoptees. Despite concerns of identity crises and developmental delays, only minor adolescent behavioral problems have been found in transracially adopted children.

10. **Physician Assisted Suicide.** Katelynn Morris, Carli Gordon, and Lauren Proctor (Dr. Meghan McGhee) Department of Social Sciences

Our research is focused around trying to figure out the major reasons why people decide to receive physician assisted suicide. We also want to look at the reasons people either support or oppose this process. Major findings so far are the reasons why people decide to have physician assisted suicide. These reasons include; terminal illness, medical costs, not wanting to be a burden on family members or loved ones, and some feel the state of wellness they are in is diminishing to the life they have led.

11. **Americans Tried Abroad.** Courtni Covington (Dr. Meghan McGhee) Department of Social Sciences

Criminal justice systems vary from country to country. Facing a criminal trial in Asia can be very different than facing a trial in North America or even Europe. Offenses like vandalism or burglary carry a much harsher sentence in other parts of the world. Not every criminal justice system allows the defendant access to an attorney. Here in America, murder can be punishable by death but this practice is banned in Europe. In the Middle East, adultery, something that is not even a crime in most countries, is punishable by stoning, also a practice that is unique to certain countries. My research will focus on Americans facing criminal charges abroad and the differences they face in a foreign country rather than the criminal justice system they are used to. I will also discuss questions such as if American citizens face the same kind of treatment abroad, and whether the United States has the right or authority to request a citizen to be extradited to America to face charges. I will discuss infamous cases like those of Amanda Knox and Michael P. Fay, looking at the facts of their case and whether the countries they were tried in treat evidence, statements, and witnesses similarly as in our criminal justice system. Not only are the basic foundations of court systems different in every court system, but so are the punishments, prisons, and media surrounding them.

12. **The Fourth Amendment: What has Happened to Citizens Right to Privacy?** Amanda Young and Clayton Darby (Dr. Meghan McGhee) Department of Social Sciences

This research looks at the transformation of the Fourth Amendment. It looks at the original meaning and purpose of the Amendment and compares that to what it has become today to see if there has been any

change. The research looks at some Supreme Court decisions that people argue violated or altered the Fourth Amendment. Also police conduct is an area of interest in this subject. We will attempt to show solid evidence either in support of those who say it has changed or to refute their claims.

13. **Capital Punishment.** Holly Weston (Dr. Meghan McGhee) Department of Social Sciences

Capital punishment, the death penalty for a crime, is the extreme penalty for a person violating the public law of the country. For hundreds of years, on a world wide scale, historically, numerous societies used executions, such as public be-headings and hangings, for punishment of cruel and horrible crimes. Then, the execution act provided swift, acceptable, just punishment for the criminal as well as acting as a deterrent for witnesses. In the modern-day, global community, nearly two-thirds of the world's countries has abolished the death penalty either in law or in practice. In fact, thirty countries have removed the death penalty within the last decade.

14. **Meth and Cocaine Use as it is related to Crime.** Tiffany Bowler, Loxie Chapman, and Amber Henderson (Dr. Meghan McGhee) Department of Social Sciences

The ADAM survey could be used to assess the effectiveness of drug law enforcement interventions in the jurisdictions where the ADAM survey was conducted. There were three findings. First, major enforcement events apparently influenced drug markets, causing buyers to alter their purchasing behaviors. Second, major drug enforcement events apparently temporarily reduced supply and increased illegal drug prices, although the effect was difficult to identify because of the absence of county-specific price data. Third, major drug enforcement events apparently had no important effect on consumption, presumably because markets adjusted by substituting lower purity drugs when drugs were in relative short supply. Meth use and crime go hand in hand. According to the DEA, most drug-related crimes are not committed by individuals trying to pay for drugs, but by people who are under the influence of drugs. Violent crimes occur when the methamphetamine user is "tweaking". 'Tweaking' is defined as "as the euphoric effects of methamphetamine diminish, abusers enter the 'tweaking' stage in which they are prone to violence, delusions, paranoia, and feelings of emptiness and dysphoria." Meth users commit an array of crimes, some of which are committed in order to pay for their addictions, while others are committed because they are under the influence of their addiction. Cocaine and street crime have become soul mates, especially in the western world. The drug is now an integral part of the world economy. In the past few decades it has become a significant export earner for many poor South American countries such as Peru , Bolivia and Columbia. Because it is an expensive drug it tends to be used by an older more affluent crowd who are quite happy to dip in and out of their emotions. But it has no real social barriers and is equally at home with the destitute who beg, borrow, steal and even kill for it.

15. **The Insanity Defense.** Summer Langford and Charlotte Cook (Dr. Meghan McGhee) Department of Social Sciences

Is the insanity defense a plausible plea for serious committed crimes? This is an important question because certain individuals aren't being held accountable for their actions based on their "mental" state. Isn't every person who commits a serious crime a little mentally off balanced? This actually brings up the temporary insanity defense also. What really constitutes insanity and how is it determined? How is the insanity defense plausible when almost all mental disorders can be treated? People use this defense to get away with their crimes. There is no excuse when they had access to medication and treatment. Individuals are getting less punishment for serious crimes compared to other individuals whose mental state isn't in question. Individuals who are truly found to be insane receive lighter treatment, therapy, and are sometimes institutionalized.

16. **Privatization Within Armed Forces: Private Military Companies.** Robert C. Kerbo (Dr. Philip D. Holley) Department of Social Sciences

The poster is about private military companies (PMC's.) PMC's are international firms which offer their services with a potential to use a form of force by military means. These PMC's employ private security and former military personnel who provide their services for a high cost; with this they earn the name Soldier of Fortune. Blackwater US and Halliburton are the most notable of PMC's. These entities offer several services, including security, transport of supplies, combative services, as well as diplomatic protection. PMC's and mercenaries have some distinct differences. Mercenaries work for anyone willing to pay the most whereas these private companies have standards and work within the beliefs of the country in which they originate. Mercenaries are purely combatants or soldiers whereas PMC's do

governmental work, reconnaissance, and security. PMC's have their advantages with specialized skills (transporting Diplomats) and disadvantages with the negative publicity they receiving ultimately giving them a poor image. These US companies are regulated by Coalition Provisional Authority (CPA). Order 17 of the law originally granted PMC's immunity from their crimes in Iraq until June 2004. The CPA now requires PMC's register all licenses, contracts, weapons, vehicles, and other equipment being used today.

**17. Crime Stoppers Can Help.** Brooke Hagens (Dr. Philip D. Holley) Department of Social Sciences

Do You Want To Stop Crime And Want To Keep Your Identity Safe? "Crime Stoppers consists of a three part approach to solving the crime problem. Crime Stoppers relies on cooperation between the police, the media, and the community to provide information about crime and criminals." Crime Stoppers is a non-profit organization which means that no tax dollars are involved and the money paid out by Crime Stoppers is from community and business fundraising and donations. An advantage of "Crime Stoppers is that it is separate from the emergency 911 telephone system that allows a member of the community to provide anonymous information about criminal activity to law enforcement agencies". Crime Stoppers starts with a phone call. The phone call is anonymous and will not be recorded. Rewards are available to callers with information that leads law enforcement to suspects. Rewards are up to \$1,000 and all callers are eligible to receive these rewards, although many callers choose not to collect the rewards. Five hundred thirty-three thousand five hundred fifty-five criminals have been arrested and charged as of March 4, 2011 in the United States. "Crime Stoppers have cleared 892,045 cases." Crime Stoppers offer rewards because persons who would have never provided information unless their identities were kept anonymous. This is an easier way for citizens to help with the crimes that they know about and help law enforcement agencies stop crime and remove criminals from the streets. Even having a reward would be a disadvantage since some people would not respond for the reward.

**18. An Inside Look at Private Investigators.** Brooke Landes (Dr. Philip D. Holley) Department of Social Sciences

A private investigator is a person who is non-law enforcement and who is licensed to do detective work. This includes investigating suspected wrongdoing or searching for missing persons. Employment can be found in several business areas: insurance companies, shopping malls, large companies, and small firms. An investigator can be involved in undercover investigations, surveillance, background investigations, discovering covert crimes, conduct interviews, gathering evidence, and stakeouts. In 2008, there were approximately 45,500 private investigators. In 2018, it is projected that there will be 55,500 private investigators. Each state has its own requirements for being a private investigator. In Oklahoma an applicant must be 18 years of age to be unarmed or 21 years of age to be an armed private investigator. They must also be of good moral character. It is an advantage to select a private investigator, because it is a competitive market and they will strive for a person's business. However, it is usually a costly service and this can be big disadvantage for many people.

**19. What Is The Impact Of The Use Of Private Security?** Tyler Rogers (Dr. Philip D. Holley) Department of Social Sciences

Private security is defined as "those individuals, organizations and services, other than public law enforcement agencies, which are engaged primarily in the prevention of crime, loss or harm to specific individuals, organizations, or facilities." Private security companies fill a wide variety of roles in the areas of physical security, information security, personnel security, and information systems security. In the year 1990, private security outspent law enforcement by 73%. Today private security agents can be found almost anywhere, including superstores, power plants, and banks. An advantage of uniformed security personnel is that citizens view them as being professionals with authority in security matters. One of the biggest problems faced by private security is a lack of cooperation with law enforcement agencies. This can create problems because private security protects the majority of the U.S. infrastructure, while law enforcement has the information about potential threats. An example of private security company is Wackenhut, which is now G4S, which guards part of the Miami Metro Rail and the Tri-Rail among many other locations.

**20. Private Investigators.** Joseph Hough (Dr. Philip D. Holley) Department of Social Sciences

Private investigators have been exaggerated in many classic movies, such as Dick Tracy. Private investigators held about 45,500 jobs in 2008. About 21 percent were self-employed, including many for whom investigative work was a second job. Private investigating can be traced back to as early as 1833

in France. Eugene Francois Vidocq, founded the first known private detective agency. Many other companies followed suit in other parts of the world. In the U.S., Allan Pinkerton. Private investigators assist individuals, businesses, and attorneys by finding and analyzing information. Most states do not require formal university education requirements; however, most states and the District of Columbia require investigators to be licensed. Licensing requirements vary. Seven states including, Alabama, Alaska, Colorado, Idaho, Mississippi, South Dakota, and Wyoming, have no statewide licensing requirements. In Oklahoma, the private investigator license is issued by Certification on Law Enforcement Education and Training (CLEET), where individuals attend classes, pay a fee, take an exam, and become certified. Some of the advantages of being a private investigator include being one's boss, work from home, meeting a variety of people, and traveling. However, an investigator maintains late or even odd hours. Another disadvantage is finding the clients willing to pay for the services.

**21. Lock Up For Profit.** Robert Scott (Dr. Philip D. Holley) Department of Social Sciences

1984 marked the start of the private prison era. Due to get tough on crime laws, the state and federal prison systems were beginning to exhaust their resources. "The privatization of prisons refers both to the takeover of existing public facilities by private operators and to the building and operation of new and additional prisons by for-profit prison companies." Private prisons operate by way of a contract granted to them by either a federal or state government by which they house inmates for a daily fee. Today, there are an estimated 165,000 beds in the U.S. prison system owned and operated by private companies, which accounts for about five percent of the total beds available. Private prisons operate on average five to fifteen percent below the operating costs of state and federal prisons. Federal and State employees are protected from being sued as long as they are performing their job under the color of law. The disadvantage to working for a private prison is that their employees aren't granted the same immunity.

**22. Privatized Out-of-Home Residential Programs: Boarding Schools for Delinquency?** Chris Robinson (Dr. Philip D. Holley) Department of Social Sciences

Although there has been a decrease in nation-wide delinquency between 1997 and 2003, the percentage of juveniles placed in private facilities has increased. In order to rehabilitate adjudicated delinquents, many states, including Oklahoma, use private out-of-home-residential programs. Private out-of-home residential programs are facilities for juvenile delinquents which provide "care including room and board, counseling, treatment, and educational services to low moderate, and high risk juveniles." There are private for profit as well as private non-profit companies. In Oklahoma, according to the 2008 Fiscal Report of the Office of Juvenile Affairs, 640 juveniles were placed in both private and public residential programs. Private residential programs are used in order to place a delinquent in programs that are specific to their needs. While some programs specialize in sex crimes, others specialize in crimes dealing with substance abuse, etc. Age and gender also play a role in determining the placement of the delinquent. In Oklahoma, private residential programs operations begin with a contract with the Office of Juvenile Affairs (OJA) who currently allocates \$142 dollars per bed per day to the company. Under the contract, companies agree to provide "residential care and treatment." One proposed advantage for using private residential programs involves the ability to function more cheaply than residential programs run by the state. One proposed disadvantage of private residential programs is the quality of care provided to the juveniles. Because private residential programs are private, their first objective is profit. Although companies must abide by requirements set for by the contract agreements between the company and the state, only the minimum requirements are needed to be met. Because of this, private residential programs are able to maximize profit by minimizing the quality of care provided.

**23. The Role Crime Stoppers Play in Solving Crimes.** David V. Barnes, Jr. (Dr. Philip D. Holley) Department of Social Sciences

Crime Stoppers is a program separate from the emergency telephone number system that allows a member of the community to provide anonymous information about criminal activity." It was started in New Mexico by a police officer who needed help with an unsolved murder. Crime Stoppers is a nonprofit organization that is funded by private donors, sponsors, and fundraisers. Crime Stoppers is operated by a board of civilian directors which consist of business people, members of the clergy, and non-governmental organizations. This board of directors is responsible for collecting money as well as deciding the amount of money that is to be given for the information that leads to an arrest. The rewards range anywhere from \$100-\$1,000. The money paid to callers is money that has been donated by private donors, sponsors, and money that was collected from fundraisers. The media is a big helper for Crime Stoppers. It uses television, newspapers, and local businesses to display pictures and information about the people who

are wanted. In the United States from 1976 to 2011, there has been 583,555 arrests made and \$82,059,292 in rewards paid to the caller. Crime stoppers like any other organization has advantages and disadvantages. An advantage from using crime stoppers is that it helps citizens anonymously report criminal suspects to help make more arrests. A disadvantage is that this program can only work if people call in.

24. **Most Wanted: Bringing Fugitives to Justice & Restoring Hope in the System.** Kaylee Manning (Dr. Philip D. Holley) Department of Social Sciences

Most Wanted are programs designed with cooperation of law enforcement agencies and citizens to help protect families, communities, and the nation by catching fugitives, and finding missing people. The Most Wanted program disseminates information about fugitives and missing children, and usually includes information about the people and their cases. The program uses the help of the community by bringing criminals to justice, putting them behind bars, and getting children home to their families. The program has many ways to send out their announcements, including: posters, milk cartons, flyers, Amber Alerts, the internet and a television show titled America's Most Wanted. The poster, milk cartons, and flyers are not always designed and released by law enforcement; the community plays a huge role as well in disseminating this information. America's Most Wanted is a reality series created by a man named John Walsh. From the program, America's Most Wanted, 1,144 fugitives have been captured, and 60 missing people have been found, since the show began in 1988, due to the help of the viewers. The program encourages citizens to help in finding the posted criminals and missing people, and notifying authorities, or "reporting a tip" on the most wanted websites. Although the program isn't always successful in catching every fugitive or finding every missing person, the program does help the agencies to locate and arrest many fugitives. Law enforcement becomes better at finding people, they become driven to make an arrest, they work as a team, not alone, and intelligence and information is shared by police. By using these programs, victims and their families, are affected in a positive way; justice is served.

25. **Privatization: Minimizing Overcrowding And Operating Costs In Our Prisons.** Tina Brown-Neely (Dr. Philip D. Holley) Department of Social Sciences

U.S. prisons have been dealing with overcrowding and housing costs since the 1970's. At the end of 2009, over 1,613,740 inmates were incarcerated approximately 8% housed in private prisons. Prison privatization means private companies are contracted by federal, state and local governments to design, build and/or operate prisons. Private prisons contract with federal, state and local governments to house inmates at a cost scale of per inmate, per day. Privatization is a proposed solution to help alleviate overcrowding and reduce the rising costs of operating our prisons. Supporters of privatization claim: comparable levels of services for inmates; lower per inmate/per day costs to the state; and an economic boost to communities surrounding private prisons. Critics of privatization question: the quality of services provided to the inmates; adequacy in training of staff; and "lowballing" initial bids only to increase fees later on.

26. **Bounty Hunters: The Real Deal.** Annie Daniel (Dr. Philip D. Holley) Department of Social Sciences

A bounty hunter is hired by a bail bond company to return people to custody who fail to show up for court dates. Included in the job of a bounty hunter is the responsibility of finding and apprehending people who have jumped bail and bringing them in to be placed in the custody of law enforcement. While searching for somebody who has jumped bail, a bounty hunter uses all resources available to find out where they are, including interviewing family and friends, doing a background check to determine who the person might be with and where they might be staying, and spending a significant amount of time casing out locations looking for the person. A summary of the 1872 U.S. Supreme Court case of Taylor v. Taintor will be included. This case established the sweeping rights of bounty hunters to recover wanted persons. Statistics show that about 10% of bail bondsmen's clients jump bail every year, which is 25,000 to 35,000 people and bounty hunters have an 87% average recovery rate. One advantage of hiring a bounty hunter to find somebody is the fact that they do not have to adhere to the same laws that policemen do, like the Fourth and Fifth amendments. A disadvantage is that the rights of bounty hunters are only recognized by the state in which they are licensed. A bounty hunter licensed in Oklahoma may not have the same privileges in other states as he or she does in Oklahoma. Licensing requirements for the state of Oklahoma include a GED or high school diploma and being at least twenty-one years of age.

27. **Private Prisons, Cheaper Cost.** Charles Hulett (Dr. Philip D. Holley) Department of Social Sciences

Corrections Corporation of America opened the first private prison in 1984. Since then the private prison industry has exploded, with reported total earnings topping one billion dollars in the year of 1997. A private correctional facility is a prison that is owned or operated under contract with a state or federal government to house inmates for a fee. For a private prison to be able to operate they must have a contract with the federal or state governments. Currently about 5.3 percent of adults incarcerated are held in private prisons. Supporters argue that, on average, private prisons can save about 11.7% to 13.6% percent less than what it cost federal and state governments. Disadvantages that opponents have argued is the significant lack of training and benefits among its employees.

28. **Private Investigation in the United States.** Guadalupe Rivera (Dr. Philip D. Holley) Department of Social Sciences

Private investigators are individuals who provide their investigative services to individuals, attorneys, corporations, and insurance companies to help them find answers and/or address concerns relevant to their interests. Private investigators do surveillance, solve crimes, find missing persons, protect people, investigate fraud, reunite adoptee and the birth parents. The different types of private investigation include computer forensic, legal, corporate, and financial. Private detectives and investigators held about 45,500 jobs in 2008 in the U.S. Some Oklahoma licensing requirements are a high school diploma and training. An advantage of hiring private investigators is that they are specially trained at handling matters with a professional and business twist. A disadvantage is the cost of a private investigator to do their job. Some potential clients may not have the resources to hire them.

29. **Who You Gonna Call? CRIME STOPPERS!** Chance Tapia (Dr. Philip D. Holley) Department of Social Sciences

Crime Stoppers is a non-profit organization founded by Greg MacAleese in 1976 in Albuquerque, New Mexico. The organization joins with the community to participate with the police in publicizing crimes in hope to receive information from anonymous callers to help solve crimes. This 3-part organization consists of the general public, media, and law enforcement working together to solve a crime. Calls are received by police lines and if relevant information is provided, citizens may receive a reward up to \$1,000 for contributing helpful information. This non-profit organization receives donations, raises money from fundraisers, and is also funded by private organizations, with no tax dollars involved. From 1976 to March 3, 2011 in the United States; 533,555 arrests have been made, 892,045 cases have been cleared, \$82,059,292 rewards paid to callers, \$2,915,611,555 drugs seized, all due to the organization Crime Stoppers. The advantage of Crime Stoppers is that it can help get police information so they can get more criminals off the street. The disadvantage of Crime Stoppers is that if no one calls in, the program would not function.

30. **Fugitive Recovery Agents.** Zachary Cremers (Dr. Philip D. Holley) Department of Social Sciences

A Fugitive Recovery Agent is a person who is employed by a bail bond company to apprehend a subject who fails to show in up court, "forfeiting their bond." A Bail Enforcement Agent is also known as a bounty hunter or bail officer. Bail officers have few restrictions. They can pursue fugitives across state lines after notifying state law enforcement and can "search and seize" without restrictions from the Fourth Amendment. Bounty hunters obtain information about the defendant's residence, previous arrests, spouse's employer, and the name of the schools their children are attending to help recover the fugitive. Bounty hunters apprehend 31,500 fugitives per year. Some advantages to bounty hunters are that they help bond companies recover money from the court and help fugitives appear for court dates. The disadvantages include limited training for bounty hunters, and that they have few legal restrictions.

31. **Papyrus: Popular vs. Overused** Tiffany Conn (Ms. Xiaomiao Wang) Department of Art

Papyrus is a roman calligraphic typeface with distinctive human touches, such as rough edges, irregular curves, and high horizontal strokes in the caps. Created by Chris Costello in 1982 and released the next year, it was hand-drawn over a period of six months by means of calligraphy pen and textured paper. Papyrus is very popular. However, some graphic designers say Papyrus has been overused. Why are people so drawn to it, and why some graphic designers aren't fond of it?

32. **Does Impact Make an Impact?** Macy Powell (Ms. Xiaomiao Wang) Department of Art

Impact font is a sans-serif typeface designed by Geoffrey Lee in 1965. It was published by Stephenson

Blake foundry. The font has ultra-thick strokes to make a "compressed" look. It has a lack of white space, which gives it its "impact." The impact of the font catches the viewer's eye immediately. Impact is a very popular font that is used for many different aspects of the world. Impact works very well for signs, such as store signs and safety signs. In fact, it is one of the most common used fonts in television. Impact is a core font for the Internet as well.

33. **The Evolution of Baskerville.** Destini Spencer (Ms. Xiaomiao Wang) Department of Art

In 1757, John Baskerville (1706–1775) in Birmingham, England designed a transitional serif typeface called Baskerville. Baskerville was revived in 1917 by Bruce Rogers, for the Harvard University Press and released by Deberny & Peignot, after falling out of use with the onset of the modern typefaces. In 1923, Baskerville was again revived in England by Stanley Morison for the British Monotype Company as part of its program of revivals. Most recently, the Baskerville typeface was used as the basis for the Mrs. Eaves typeface in 1996, designed by Zuzana Licko.

34. **American Currency and Typography.** Kyle Johnson (Ms. Xiaomiao Wang) Department of Art

The American dollar is the most common denomination of American currency. Its history of design dates back to the middle of the 19th Century and its composition and style have continually changed for 150 years. The dollar is investigated as a resource for the progression of typographic style. The relationship between handwriting styles of the time/script used in design is directly associated to the typography used in creating the bank note. Attention is held specifically to the ornate qualities of writing of the 19th Century and the progression of writing style to a modern approach of the late 20th and 21st Centuries and the designs that continued to change therein.

35. **The Introduction of PMingLiU.** ChienMing Lo (Ms. Xiaomiao Wang) Department of Art

PMingLiU is one of Chinese typefaces: Song/Ming typeface, which is used in Chinese, Japanese and Korean languages. The names of Song and Ming correspond to the Song Dynasty and Ming Dynasty. During the time, a unique script style developed into the Song/Ming typeface. In Mainland China, the most common name is Song. In Hong Kong, Taiwan, Japan and Korea, Ming is prevalent. The research will focus on the characteristics of PMingLiU font, and compare the difference between PMingLiU and MingLiU fonts. Moreover, PMingLiU designed by different company show their subtle differences in the present of ideography.

36. **The Elegant Art of Zapfino.** Jillian Griffith (Ms. Xiaomiao Wang) Department of Art

The font Zapfino was created in 1944 by the renown calligrapher Hermann Zapf. At that time, Zapf was a mapping officer during World War II and Zapfino was part of his sketchbook. The font that we know today was recreated in 1998. Zapfino is a calligraphy based font that is composed of elegant lines and flourishes. It was designed for Linotype, with the help of the company itself and David Siegel. The goal of the team was to create the first versatile calligraphy font. Each character and glyph has no less than four variations all of which change to fit the letters surrounding them. Since Zapfino is such an elegant font, it is mainly used for weddings, dinner parties, gala openings and other events. Zapfino is slowly becoming more popular in the next few years.

37. **Ancient to Present.** Jonathan Austad (Ms. Xiaomiao Wang) Department of Art

Trajan is an ancient style serif typeface designed in 1989 by Carol Twombly for adobe. In typography, serifs are semi-structural details on the ends of some of the strokes that make up letters and symbols. A typeface that has serifs is called a serif typeface. A typeface without serifs is called sans-serif, from the French sans, meaning without. Some typography sources refer to sans-serif typefaces as grotesque or gothic, and serif types as roman. Trajan is based on the letterforms used for the inscription at the base of Trajan's column. Since lower case forms were not in use in Roman times, Trajan is an all-capitals font. Trajan font is commonly used in movie posters, television show and book covers.

38. **The Etiquette of Business Card Typography.** Allyson Doane (Ms. Xiaomiao Wang) Department of Art

Just as a student would not use a biology book for an economics class, using an inappropriate font in advertising could be disastrous for a company. It is extremely important for a business to consider their company reputation and image when choosing fonts and text size for their advertising materials, including

their business cards. A business card is the first contact a person experiences from a company or business, so a chosen typography can truly “make or break” a corporation. Font, size, and other parameters of typography play vital roles in business card design.

**39. Typography in Album Design.** Jennifer Barnes (Ms. Xiaomiao Wang) Department of Art

In 1938, Alex Steinweiss of Columbia Records was accredited with inventing the concept of album covers and cover art, replacing the plain covers used before. His work included eye-catching graphics, vivid colors and amazing typography. Over time, typography in album design has become an important part of the music industry, both as marketing tools and cultural symbols. This topic will discuss typography as a creative element behind an album design. Color, placement, style and size of fonts are important aspects when considering the design of an album cover. The design must attract the attention of fans, and most importantly express the personal ideas of the musicians or bands.

**40. Typography in Print Design.** Estrella Lopez (Ms. Xiaomiao Wang) Department of Art

Readers crave to see space and try to eliminate reading clusters of words while reading. Graphic designers have found a creative way to make a desirable reading composition. Typography is no longer used just as a text but also as an image. Many graphic designers use typography as a way of capturing the viewers' eye. Print design is no longer about creating simple layout, by using types with dramatic colors, composition and creative methods to keep the viewers interested. To create a page that is both attractive to look at and easy to read, designers use a variety of strategies to counteract or eliminate clogged and cramped text. These strategies motivate the reader to stay alert and interact with the reading. By researching Typography along with print design, the viewers will have a better understanding of why designers have chosen to incorporate these creative methods of typography to compete for a visual attention.

**41. Typography in Fine Art Today.** Martin Lopez (Ms. Xiaomiao Wang) Department of Art

The importance of typography in everyday life is something no one can argue. Since the dawn of the technology that allowed us to publish information on massive scales, we have been able to communicate faster, easier, and more conveniently, especially as that technology advances, which also relates to the decline of handwritten messages with all the style and personality that they reflected of the individual now replaced in typography by characteristics such as font, color, and size. Aside from that aspect of typography, its correlation to design has evolved and become a primary, crucial component to the graphic design industry. However, something that wasn't as recognized in prior eras was its relevance to fine art and its incorporation of visual communication in that respect. The topic of primary interest explores how typography today has extended its reach of influence in areas of fine art where traditionally it had rarely heavily presented itself. Art forms of today such as graffiti, pop art, and others have all started using type as a primary element vital to the artwork. Images and information referring to that concept will be used to demonstrate the current trends of typography in fine arts today.

**42. The Lost and Found of Baskerville.** Chelsey Seamann (Ms. Xiaomiao Wang) Department of Art

John Baskerville was born in 1706 at Sion Hill, Wolverley, Worcester, England. Around 1754 he produced his first typeface, Baskerville named after himself. Baskerville designed type with delicacy, visual eloquence, and simplicity. Baskerville's guiding principle as a designer was clarity. John Baskerville's Baskerville typeface was not successful with printers of the time and disappeared in commercial markets for more than 150 years until the early 20th century. With the revival of the typeface in the 20th century there has been many different versions of Baskerville created with inspiration for the original typeface. Among those is Monotype Baskerville (Series 169), which is perhaps the best known of the revivals was a commercial success. Linotype released a revised and updated version of Baskerville that included additional weights with corresponding italics. When ITC gained the rights to the family they released ITC New Baskerville. Other versions of Baskerville include John Baskerville, Baskerville 1757, and Mrs Eaves. The modern revivals of Baskerville are ideally suited to the setting of continuous text.

**43. Hardcore music... Can it be therapeutic?** Brooke Roulet (Dr. Sophia Lee) Department of Music

Hardcore music is becoming an emerging popular genre listened to by the adolescent population. Hardcore music is fast pace music, and is seen as rebellious. It has a thicker sound, contains double bass, and generally includes breakdowns, which is a beat much slower than the original beat of the song.

It is focused more on the rhythm and not the melody because the lyrics are usually either screamed or spoken, not sung. These characteristics make this type of music attractive to adolescents, which is why they listen to it. Many researchers have examined why music is so important to adolescents and how adolescents actively use music to satisfy particular social, emotional, and developmental needs. There have been many cases where rock music has been used therapeutically. Music can be extremely powerful when used in a therapy session. Music Therapy is the clinical and evidence-based use of music interventions to accomplish individualized goals within a therapeutic relationship by a credentialed professional who has completed an approved music therapy program. Since rock music has been used therapeutically with adolescents in music therapy sessions, hardcore music should be able to be used therapeutically.

44. **Age and Student Status: Does Career Decidedness Increase with Age and Experience?** Allison Stegman (Dr. Jared F. Edwards) Department of Psychology

This report is part of a larger study designed to aid in understanding the variables related to career decidedness among college students. Career decidedness is a construct comprised of level of Certainty and level of Indecision (Osipow et al., 1976). In this report we are examining decidedness in relation to age and class rank with the expectation that both age and upper-class academic status will predict higher levels of Certainty and lower levels of Indecision.

45. **Certainty and Satisfaction: Do Self-Reports of Career Variables Predict Standardized Assessments?** Lahcen Andru Dallaly (Dr. Jared F. Edwards) Department of Psychology

This report is part of a larger study designed to understand the variables related to career decidedness among college students. Career decidedness is a construct comprised of level of Certainty and level of Indecision (Osipow et al., 1976). In this report we are examining decidedness in relation to self-reported satisfaction with and certainty of major choice with the expectation that both self-reported certainty and self-reported satisfaction will predict higher levels of Certainty and lower levels of Indecision as measured by the Career Decision Scale (CDS, Osipow et al., 1976).

46. **Abnormal Psychology Instruction: Do Demographics Predict Student Interest in Disorders?** Dana Clark (Dr. Jared F. Edwards) Department of Psychology

The goal of this study is to understand interest levels in the topics of Abnormal Psychology. Possible outcome applications include adjusting the teaching of Abnormal Psychology so that it keeps all students interested during the course while continuing to meet the needs of those students planning further study in psychology. It has been our experience that Abnormal Psychology tends to attract high numbers of non-psychology majors due to a general and vague interest in unusual human behavior. Searches through Psych Lit and Psych Info through the Ebsco Host search engine did not return any results matching this topic. Therefore, we used the methodology of a previous study on interest in topics in General Psychology (Edwards, 2010) to examine students' perceptions of the different disorders covered in Abnormal Psychology.

47. **The Hybrid Phillips Curve With Memory.** Dr. Christopher Shane<sup>1</sup> and Dr. Vivien Chu<sup>2</sup>, Department of Mathematics<sup>1</sup>, Department of Social Sciences<sup>2</sup>

The Phillips curve illustrates a negative relationship between unemployment and inflation in the short run. When the economy is booming, increasing aggregate demand drives up the price level, generating more job opportunities and lower unemployment. On the other hand, a slack demand will depress the price level and lead to high unemployment. This simple equation presents a dilemma that policymakers face when achieving low inflation and low unemployment. The Phillips curve provides three economic applications. First, it can be used to measure the inflation persistence and the correlation with excess demand. In a hybrid Phillips curve, the coefficients on expected inflation, lagged inflation and output gap are estimated to examine the relative importance on the determination of current inflation. Second, its slope evaluates the size of real effects of nominal shocks. Third, the Phillips curve can be utilized for inflation forecasts. With the inclusion of other activity variables, the Phillips curve provides good but episodic forecasts. The hybrid Phillips curve, containing a lagged term of inflation, implicitly characterizes inflation persistence. However, due to empirical limitations, there is a lack of literature explicitly incorporating the long memory of inflation into the Phillips curve. In this paper, we deal with inflation persistence from a mathematician's perspective. We adopt Caputo's mathematical memory function to embody the property of inflation persistence in the hybrid Phillips curve. From an econometrician's

viewpoint, persistence is sometimes referred to as long-range dependence or long memory and described in terms of autocovariance. Caputo's memory function provides the same insight for an Autoregressive Fractionally Integrated Moving Average (ARFIMA) time series model. We use a hybrid Phillips curve with memory to conduct inflation forecasts and measure the fit to real data.

48. **The Simpsons in a General Economics Classroom: An Assessment.** Dr. Vivien Chu<sup>1</sup> and Dr. Chris Shane<sup>2</sup>, Department of Social Sciences<sup>1</sup>, Department of Mathematics<sup>2</sup>

This paper quantifies the effectiveness of teaching Economics with the American TV show The Simpsons in a general education classroom. We evaluate students' understanding of Economics concepts by comparing their pop quiz scores and exam scores on answering The Simpsons related questions. The results indicate that students who watch the Simpsons tend to retain their memories for the definition questions with complete description rather than analytical questions. They also receive 40% higher scores on average than students who do not watch the Simpsons when answering the Simpsons related questions on the exam.

49. **Proteomic Analysis May Predict Key Proteins Underlying Synaptogenesis.** Maggie Yoder (Dr. Andrea Holgado) Department of Biological Sciences

Synaptogenesis is a key developmental pathway underlying neuronal wiring in embryos and adult animals. During embryogenesis and in the adult brain, neurons are continuously forming new connections or disassembling existing synapses. In any case, a poorly understood dynamic phenomenon underlies synaptic formation and plasticity. To bring some light into the understanding of synaptogenesis, we began a proteomic analysis using the genetic model organism *C. elegans*. Previous work using the *vsm-1(ok1468)* mutant has shown that these nematodes have abnormal locomotion, increased synaptic transmission, and greater synaptic density when compared to the WT. These data suggest the *C. elegans* VSM-1 has an inhibitory role in exocytosis affecting synaptogenesis and synaptic transmission. To better understand the molecular machinery mediating *vsm-1(ok1468)* mutants' phenotype we compared their protein profiles and levels of expression with that seen in WT nematodes. Synchronized young adults were harvested for protein extraction and two dimensional protein gels were run for analysis. Coomassie G250 stained gels were imaged and the PQuest software was used for densitometry and profile examinations. Once differences in protein expression are determined, spots containing highly expressed polypeptides or proteins found in the *vsm-1(ok1468)* mutant only will be excised and analyzed using mass spectrometry. Identification of such proteins will uncover key players promoting enhanced synaptogenesis and synaptic transmission.

50. ***C. elegans* v-SNARE Master Protein 1 Is Enriched At Synapses.** LaKesha Seals, Guneet Kaur, and Maggie Yoder (Dr. Andrea Holgado) Department of Biological Sciences

In many signaling pathways, molecular signals are transmitted from one cell to another by a process known as exocytosis. During synaptic signaling, a calcium ion influx along the presynaptic neuron causes synaptic vesicle fusion and neurotransmitter release. Exocytosed neurotransmitters attach to receptors on the postsynaptic cell and trigger action potentials on the receiving cell. The fusion of synaptic vesicles with the plasma membrane is accomplished by the formation of SNARE complexes. VSM-1 is a v-SNARE interacting protein that acts as a SNARE regulator, preventing the formation of SNARE complexes during membrane fusion. Work reported by Gerst and collaborators have shown that yeast homolog SNARE proteins of syntaxin and synaptobrevin bind to VSM-1 in a phosphorylation dependent manner. This process resulted in the inhibition of exocytosis at the vesicular priming step. To advance our knowledge on the regulation of synaptic vesicle exocytosis, we began characterizing the expression of endogenous VSM-1 in the genetic model organism *C. elegans*. First, an affinity purified GST::VSM-1 recombinant protein was injected into guinea pigs. Second, a resin that binds to proteins other than Immunoglobulins was used to purify the VSM-1 antibody from the serum. Third, the mixture of anti-GST and anti-VSM-1 antibodies were treated with GST beads and a pure anti-VSM-1 antibody sample was generated. Last, whole-mounted worm immunostaining performed using pure antibody samples showed that native VSM-1 proteins are enriched at synapses, especially along neuromuscular junctions. Additionally, the aforementioned immunostaining pattern was observed in wild-type nematodes, but non-detectable in *vsm-1(ok1468)* deletion mutants. Analysis using western blots also demonstrated that wild-type nematodes express a 40KDa protein which is absent in *vsm-1(ok1468)* deletion mutants. This study focusing on expression profiles will be followed by functional analysis assays.

51. **Physiological Role of the Brain Metabolite Lanthionine Ketimine (LK) in vivo.** Erica Benda<sup>1</sup>, Tyler

Hardin<sup>1</sup>, and Taylor Baxter<sup>1</sup> (Dr. Andrea Holgado<sup>1</sup> and Dr. Kenneth Hensley<sup>2</sup>) SWOSU Department of Biological Sciences<sup>1</sup>, University of Toledo at Ohio Department of Pathology<sup>2</sup>

2H-1,4-Thiazine-5,6-dihydro-3,5-dicarboxylic acid (AKA: lanthionine ketimine) is a poorly understood class of cyclic sulfur-containing imino acids derived from cysteine metabolism. Fluorometric assays and HPLC techniques have shown that lanthionine ketimine (LK) is detected in bovine brain extracts and bovine synaptosomes. Proteomic analysis of LK interacting binding partners showed that LK binds to CRMP2/UNC-33 and STXBP1/UNC-18, neuronal proteins involved in synaptic remodeling and synaptic vesicle priming/fusion. Explorations of functional implications of LK interactions demonstrated that the cell-permeable synthetic LK-ester (LKE) was nontoxic and protected NSC-34 motor neuron-like cells against hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>). To further investigate the biological role of LK at synapses and explore the physiological relevance of LK:CRMP2 and LK:UNC-18 interactions, we began testing the effects of LK in nematodes. A cell-permeable LKE was administered to *C. elegans* nematodes, which were subsequently analyzed for synaptic function via aldicarb exposure: a cholinesterase inhibitor. Aldicarb sensitivity analysis demonstrated that wild-type animals grown in the presence of LKE had normal release of ACh while animals over-expressing YFP in neurons and grown in the presence of LKE have a reduced cholinergic release rate. This reduced synaptic function phenotype was found to be mediated by UNC-18 and UNC-33. Mutants lacking UNC-18 and UNC-33 proteins showed no significant LKE effects when aldicarb sensitivity was tested, suggesting that LKE binding to these synaptic protein partners negatively regulates synaptic signaling in nematodes.

**52. Collapsin Response Mediator Protein-2 (CRMP2/UNC-33): A Target For New Therapeutics Against Alzheimer's, Schizophrenia and Epilepsy.** Tyler Hardin<sup>1</sup>, Erica Benda<sup>1</sup>, and Taylor Baxter<sup>1</sup> (Dr. Andrea Holgado<sup>1</sup> and Dr. Kenneth Hensley<sup>2</sup>) SWOSU Department of Biological Sciences<sup>1</sup>, University of Toledo at Ohio Department of Pathology<sup>2</sup>

Mammalian CRMP2 and the *C. elegans* homolog UNC-33 are multifaceted protein families involved in a variety of normal cellular functions such as synaptic remodeling and plasticity; synaptic vesicle trafficking and neurotransmitter release; and membrane endocytosis and cytoskeletal dynamics. CRMP2 has also been associated with pathological disorders and neurodegeneration. For instance, CRMP2 expression levels are decreased in brains of Alzheimer's patients. Detectable CRMP2 was shown to be highly oxidized and modified by kinases, phenomena implicated in Alzheimer's disease-associated neuritic dystrophy. In paranoid schizophrenia, the CRMP2 promoter region is highly polymorphic, suggesting that the regulation of the gene expression may play an important role in mental health. Lastly, the anticonvulsive drug lacosamide (VimPat) was found to act by binding to CRMP2 which unmasked the pharmacological importance of CRMP2-binding small molecules to epileptiform pathologies. Thus, based on these observations, we hypothesize that CRMP2 plays a central role in normal and pathological brain functions.

Moreover, we reasoned that if we target CRMP2 therapeutically, we may reverse or slow-down onsets of many neurodegenerative disorders. To this end, we began a study focused on the *in vivo* effects of Lanthionine ketamine (LK); a natural brain metabolite found to bind to CRMP2 *in vitro*. *C. elegans* nematodes containing a multi-copy transgene for *punc-17::YFP* were grown in the presence of the cell permeable LK-ester (LKE) and synaptic connections were examined. Fluorescent imaging analysis demonstrated the LKE affects neuronal morphology and alters wiring connecting ventral and dorsal cords. These wiring abnormalities seem to be dependent on the expression of all CRMP2/UNC-33 isoforms. To summarize, studies using the genetic model organism *C. elegans* reiterate the importance of using CRMP2/UNC-33 as a target for new drug developments.

**53. Analysis of the Molecular Mechanism Underlying VSM-1 Function.** Angela Edwards, Brian Dao, and Maggie Yoder (Dr. Andrea Holgado) Department of Biological Sciences

VSM-1 is a recently identified SNARE master protein capable of negatively regulating membrane fusion and vesicular exocytosis. Mechanistically, published work has shown that VSM-1 binds to syntaxin and synaptobrevin homologs, thus blocking the formation of SNARE complexes in yeast. To explore the molecular mechanisms underlying the inhibitory role of VSM-1 in synaptic vesicle exocytosis, we began identifying *C. elegans* VSM-1 interacting partners using pull-down and co-immunoprecipitation assays. In pull-down experiments, GST::VSM-1 and GST proteins were affinity purified from *E. coli* using glutathione sepharose beads. These beads containing GST::VSM-1 and GST alone were incubated with nematodes' crude protein extracts. After binding, beads were washed and bound proteins were resolved using SDS-PAGE and Coomassie staining. In the case of coimmunoprecipitation assays (Co-IP), a polyclonal anti-VSM-1 antibody was generated using the affinity purified VSM-1 protein as the antigen. The polyclonal antibody was then conjugated to magnetic beads to be used in Co-IP experiments. VSM-1 interacting

binding proteins isolated using wild-type and *vsm-1* (ok1468) nematode protein extracts were separated by SDS-PAGE and individual protein bands were detected by densitometry scanning of Coomassie stained gels. Finally, identified bands detected in experimental conditions and absent in negative controls will be further analyzed using mass spectrometry, where their amino acid sequences will be obtained.

54. ***vsm-1* and Synaptogenesis: A Genomic Approach.** Kassandra Guthmueller and Carissa Fischer (Dr. Andrea Holgado) Department of Biological Sciences

Synapses are composed of a presynaptic active zone associated with a postsynaptic terminal, the target cell to which the presynaptic specialization will pass its message. In the case of chemical synapses, messages are carried in neurotransmitters from presynaptic to postsynaptic terminal via exocytosis. Previous research in *Caenorhabditis elegans* has shown that VSM-1 protein negatively regulates exocytosis. Additionally, analysis of *vsm-1* mutants' synapses showed that animals lacking a fully functional VSM-1 have increased synaptic connectivity. Based on these preliminary findings, we hypothesized that *C. elegans* VSM-1 may play a crucial role in synaptogenesis. To test this hypothesis, microarray analysis was performed and gene expression profiles were determined. Based upon analysis of microarray data, it appeared that many candidate genes exhibit induction as a result of the *vsm-1* mutation. Once candidate genes were identified, specific primers for those genes were generated for the purpose of cDNA synthesis. Upon cDNA synthesis, real time PCR was performed in triplicate for both wild type and *vsm-1* (ok1468) mutants. Threshold cycles ( $\Delta$ CT) were compared for the housekeeping genes *cdc-42* and *pmp-3* for controls. Then the corrected  $\Delta$ CT for candidate genes ( $\Delta\Delta$ CT) were then compared to determine levels of induction or repression.

55. **Cloning The Sodium-Calcium Exchanger Cytoplasmic Loop For Further Biophysical Characterization.** Tanner Wheeler and Guneet Kaur (Dr. Andrea Holgado) Department of Biological Sciences

A sodium-calcium exchanger is an integral membrane protein expressed in all cells. This exchanger protein has four different modes of action. For instance, the sodium-calcium exchanger can translocate three sodium ions for one calcium ion, one calcium ion for three sodium ions, one sodium ion for a sodium ion, or one calcium ion for one calcium ion. Structural and topological analysis demonstrated that this integral membrane protein contains eleven transmembrane domains and a long cytoplasmic loop between an amino-terminal hydrophobic domain (transmembrane segment 5) and a carboxyl-terminal domain (transmembrane segment 6). Furthermore, molecular analysis demonstrated that amino acids present in the cytoplasmic loop are heavily targeted by posttranslational modifications. Recent studies have shown that the exchanger translocation functions are modulated by phosphorylating critical amino acids present in the cytoplasmic loop. Thus, to test the modulatory functions of the cytoplasmic loop, we will amplify the loop sequence using PCR. Next we will anneal the PCR amplicon with a linear expression vector containing a his-tag sequence. Once the recombinant DNA plasmid is generated, we will transform it into *E.coli* bacterial cells, and induce the expression of the sodium-calcium exchanger cytoplasmic loop. Lastly, we will affinity purify this loop and determine its function and regulation.

56. **Comparative genomic analysis of GAPDH from Mint and Thyme.** Stephanie Chidester and Steven Bozell (Dr. Muatasem Ubeidat) Department of Biological Sciences

Glyceraldehyde 3-Phosphate Dehydrogenase (GAPDH) is an enzyme responsible for the sixth step in glycolysis where glucose is split into two 3-carbon molecules. In glycolysis, glucose is broken down in order to produce energy. GAPDH is found in all plants making it easy to assume that this enzyme has an important role in the evolution of plants from their common ancestor. The goal of researching this enzyme is to be able to comparatively analyze its evolutionary significance. By amplifying this specific gene in *Mentha requienii* and *Thymus vulgaris* and sequencing it, the similarities between nucleotide sequences of the gene will hopefully provide the predicted evidence supporting the evolutionary significance of GAPDH. These nucleotide sequences will then be compared with other known sequences for further support.

57. **Analysis of Glyceraldehyde 3-Phosphate Dehydrogenase gene from Arugula and Sage.** Lauren Lee and Steven Bozell (Dr. Muatasem Ubeidat) Department of Biological Sciences

In glycolysis, GAPDH enzyme participates in the breakdown of glucose to two 3-carbon molecules. Glycolysis is very important as a first step in energy production in the cell. GAPDH is found in plant cells making it a perfect link between the ancestor of all plants and today's modern plants. Our project involves

the isolation and sequencing of the gene obtained from *Eruca vesicaria sativa* (arugula) and in *Salvia officinalis* (sage). Knowing the sequences and doing comparative analysis on these sequences of such important gene will help us find out the evolutionary significance of this gene.

58. **Sequence Determination and Analysis of GAPDH from *Petroselinum crispum*.** Wilfred Assongwe and Steven Bozell (Dr. Muatasem Ubeidat) Department of Biological Sciences

*Petroselinum crispum* is a grass-like plant. Its common name is Italian Parsley. Our aim is to find out if GAPDH genes are conserved in *Petroselinum crispum* and some other plants GAPDH studied in the lab. By sequencing this gene, it will be possible to study its sequence and mutations; this information could be useful in future studies. Also by finding similarity and differences in sequence between *Petroselinum crispum* and the other plants GAPDH, it will be possible to find the evolutionary relation between these plants.

59. **Genomic Isolation and Sequence Comparison of Sweet Potato and Geranium GAPDH Gene.** Sari Elvis Tawe and Steven Bozell (Dr. Muatasem Ubeidat) Department of Biological Sciences

Gene cloning and sequencing are challenging technique frequently used in the creation of an exact genetic copy of an organism and determine the nucleotide sequence of their given DNA. The main goal for this research is to extract genomic DNA then isolate, sequence and characterize the GAPDH (glyceraldehyde-3-phosphate dehydrogenase) gene from the plant species of sweet potato (*Ipomoea*) and Geranium (*pelargonium*) to find out if GAPDH gene evolved with these plants in their evolutionary development. GAPDH gene is known as a housekeeping gene which serves as a vital enzyme for plants and a catalyst for an important step in glycolysis.

60. **Inositol Phosphates in the Biomedical Research Model Organism *Dictyostelium*.** Dr. Muatasem Ubeidat, Department of Biological Sciences

InsP5 3/5-kinase is the first inositol pentakisphosphate kinase purified from *Dictyostelium*. The kinase appears to be the enzyme responsible for the synthesis of InsP6 from inositol tetra- and pentakisphosphates. It displays selectivity for Ins(1,2,3,4,6)P5 and Ins(1,2,4,5,6)P5. InsP5 3/5-kinase has a broad spectrum of substrates. The present study has provided several lines of evidence for the view that the two kinase reactions (3-kinase and 5-kinase reactions) are catalyzed by the same enzyme. They were co-eluted in one peak, phosphorylated Ins(1,2,4,5,6)P5 and Ins(1,2,3,4,6)P5 at the 3- and 5-positions, respectively. And Ins(1,2,4,6)P4 was phosphorylated at both positions to InsP6. Although, SDS-PAGE indicated that the final enzyme preparation predominantly comprised a band of 43 kDa which is consistent with the native molecular weight of the enzyme. Furthermore, InsP5 3/5-kinase displays a broad pH-optima (5.5-7.5) using both substrates. These observations lead to the suggestion that both enzyme activities reside in the same protein. Although this will not be formally proven until the enzyme is sequenced, cloned and expressed. InsP5 3/5 kinase could be the enzyme responsible for the homeostasis of InsP6 in *D. discoideum*. This would be reached by the combination of the forward and the backward reactions or the futile cycle of kinase/InsP6-phosphohydrolase. The other functions could come from the combination of the reactions of the kinase with that of InsP5/InsP4 phosphohydrolase and InsP6-phosphohydrolase as a source for the production of the lower phosphorylated inositol phosphates which could play a physiological role in *D. discoideum*. The kinase can be used for the assignment of absolute configuration of several synthetic or natural inositol polyphosphates or to produce pure enantiomers of specific inositol polyphosphates. It can be also used alone or in a combination with the other enzymes mentioned above as a tool to synthesize specifically labeled and non-labeled inositol phosphates.

61. **Does Long-term Culturing Result in Cytological Changes in Freshwater Algae?** Holley D. Ladymon (Dr. Steven W. O'Neal) Department of Biological Sciences

The purpose of this study was to investigate whether long-term culturing affects the morphological and cytological characteristics of freshwater algae. Culture collections around the world maintain algae for use in a variety of biological studies. It is assumed that cultured organisms retain the normal physiological and morphological characteristics of the wild populations from which they were isolated. However, long-term culturing of organisms under artificial conditions could potentially produce changes in growth form and other characteristics that could invalidate studies using cultured algae. A culture collection of freshwater algae has been maintained in the SWOSU Department of Biological Sciences since 1993 and was used in this study. A photographic record of each alga currently in the SWOSU culture collection was made using an Olympus BH2 light microscope coupled with a SPOT™ Idea™ 3.0 megapixel digital

camera. Images were stored and measured using the SPOT 4.7 software program. Images were taken at magnifications ranging from 40 to 400X total magnification using Koehler illumination settings. Images were taken that illustrate distinguishing characteristics of each alga. Cellular dimensions (diameters and lengths) were determined from the images using the measuring function of the software. Images and measurements from the current study were compared with similar images and measurements made for the culture collection 13 years previously. Cell dimensions were analyzed statistically using the StatView® statistics package.

**62. Decision-Making In Feeding And Mating Behaviors Of Field Collected Fruit Flies (*Drosophila melanogaster*).** Irene Lopez (Dr. Jimena Aracena) Department of Biological Sciences

Fruit flies (*Drosophila melanogaster*) are excellent models to study the genetic basis of behavior in the laboratory. Our main purpose is to test the flies' ability to make decisions between conflicting excitatory inputs: feeding and mating. Individual virgin and previously mated flies of both sexes were placed in test tubes and were deprived of food for 0 or 18 hours. One male and one female were placed in a testing arena containing food. We recorded the hierarchy of behaviors (mating, grooming, or feeding) as well as the time spent on each behavior for each individual fly. Preliminary observations suggest that both virgin and previously mated flies spend about fifty percent of their time walking and exploring. It also has shown that mating status highly influences their behavior. Virgin flies are more likely to mate than previously mated flies.

**63. Differential Starvation Survival of Field Collected and Laboratory Wild Type Fruit Flies (*Drosophila melanogaster*).** Pamela Moreno (Dr. Jimena Aracena) Department of Biological Sciences

Most popular strains of wild type fruit flies (*Drosophila melanogaster*) used in genetic and behavioral tests have low genetic variation, due to environmental homogeneity and genetic drift caused by the small culture vials that are used to maintain them. We collected flies from the field (strain GG) to compare their physiology and behavior to laboratory fruit flies (strain Oregon R). Both strains of flies were kept in the laboratory for one to three generations before testing their length of survival during starvation. We recorded the length of time that each fly survived with access to water. GG females survived significantly longer than GG males and there was no significant difference between GG males, Oregon R males, and Oregon R females. Preliminary testing of the buoyancy in adults and larvae, suggest that female flies are under selection to increase fat storage in the field but not in the laboratory. Males do not appear to be under the same selection pressure as females.

**64. Feeding and Foraging behavior of Fragile X Syndrome (FXS) Mutant Fruit Flies (*Drosophila melanogaster*).** Melissa Peters (Dr. Jimena Aracena) Department of Biological Sciences

Mutant fruit flies (*Drosophila melanogaster*) of the strain *dfmr 1* are used as models to study Fragile X Syndrome (FXS), which is a leading cause of neurological disorders in humans. These mutant flies show increased repetitive behaviors and hyperactivity similar to that seen in humans with FXS and their phenotype worsens with age. Our purpose is to test the effect of the flies' mutation on complex behaviors such as feeding and foraging in semi-natural laboratory food patches and compare these behaviors to field collected wild type flies. Foraging efficiently in patches of food requires assessment of resources, accurate timing, memory, local search, and decision-making. In order to test the effect of the mutation on these behaviors, we will also compare the foraging efficiency of the *dfmr 1* mutants to an internal control (a genetically designed rescue) strain. Our preliminary results show that the mutant flies have lower survival rates than wild types. We are currently testing the ability of wild type and mutant flies to choose between food sources consisting of different sugar concentrations in semi-natural patches of food.

**65. Exploration of Heme Biosynthesis Mutants in *Vibrio fischeri*.** Tyler M. Shadi<sup>1</sup> (Dr. Eric V. Stabb<sup>2</sup>) Department of Biological Chemistry<sup>1</sup>, Department of Microbiology at The University of Georgia<sup>2</sup>

The symbiotic relationship of *Vibrio fischeri* and *Euprymna scolopes* is a model system for host-microbe interactions. The goal of this project is to generate conditionally lethal mutants of *Vibrio fischeri* by means of transposon mutagenesis. These mutants will provide an addition to a genome-wide transposon library currently being constructed by multiple labs. After characterizing the growth, motility, and luminescence phenotypes of the conditionally lethal mutants, these strains will be used to colonize the squid and determine if the required growth supplement may be present in the host. Three previously isolated mutants had transposon insertions blocking the following genes: *hemA*, *hemL*, and *hemH*. Heme is a cofactor is cytochrome oxidases which are responsible for aerobic respiration. Heme also allows for

functional catalase ability in helping degrade hydrogen peroxide, a reactive oxygen species (ROS) generated by the host and in cellular respiration. Work by Nakahigashi et al., 1999 demonstrated hemH mutants in *E. coli* K-12 accumulated protoporphyrin IX which is easily degraded into ROS in the presence of light. Previous experiments have also shown the hemH mutant unable to colonize the squid; this is possibly due to increased ROS or lack of heme. Experiments were performed to elucidate possible sensitivity of the mutants to ROS, specifically hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>). In order to illuminate on colonization properties of hemH, disc diffusion assays with 3% H<sub>2</sub>O<sub>2</sub> were performed under various growth conditions. Preliminary results show that the hemH mutant is not more sensitive to H<sub>2</sub>O<sub>2</sub> suggesting the colonization phenotype is possibly due to lack of heme biosynthesis.

**66. Increased Bacterial Virulence Under Zero Gravity Conditions.** Tyler M. Shadid (Dr. Eric Paul) School of Allied Health

Space flight exposes astronauts to tough environments before, during, and after the journey. These stressors increase susceptibility of astronauts to opportunistic pathogens. Bacteria are armed with a large arsenal of virulence factors that give the bacterium the ability to attach to host cells and maneuver around the host environment, facilitating colonization and immune avoidance. One such set of virulence factors is the presence of motility organelles, including flagella (swimming) and pili (twitching). This project examines normal bacteria under zero gravity conditions encountered in space and their ability to cause disease. *Pseudomonas aeruginosa* is a bacterium found in soil, water and on the skin that can cause urinary tract, lung, and kidney infections. *Escherichia coli* is a bacterium found in the gut that contributes to gastrointestinal and urinary tract infections. These microbes were grown in conditions mimicking zero gravity and normal gravity conditions. We then conducted twitching assays on test microbes to examine if space conditions enhance disease establishment. After extended growth periods, *P. aeruginosa* grown under zero gravity conditions showed a significant difference in the spreading/twitching growth on 0.3% agar motility plates, as well as a significantly different colony morphology, compared to cultures grown under normal gravity conditions. *E. coli* cultures had a much less pronounced difference in the two conditions studied. These results led us to believe that in addition to a weakened immune system, some of the pathogens show increased virulence under zero gravity conditions. We are working towards understanding the molecular aspects of the twitching assay to determine the genes responsible for this differential effect.

**67. Autism Awareness.** Karli Visor (Dr. Lisa A. Appeddu) School of Allied Health Sciences

Autism is one of a spectrum of disorders characterized by impairments in communication and socialization and the presence of repetitive or restrictive behaviors. Currently, its causes and contributing factors are poorly understood, which leads to a general lack of understanding in the general public. Therefore, the objectives of this research were to determine the prevalence of students attending Southwestern Oklahoma State University (SWOSU) who know someone with Autism and to assess their knowledge about its definition, causes and treatment options. A survey was conducted in Fall 2010 by using convenience sampling of 55 SWOSU students. This project was done to meet Health Statistics course requirements. Funding provided by a SWOSU CPGS Organized Research Grant. Results suggest SWOSU students, on average, know at least one person with Autism. Overall, SWOSU students rated themselves as knowing very little about Autism. In contrast, the majority of students defined this disorder and identified treatment options correctly. Although the exact cause of Autism is not known, the top three suspected causes identified by SWOSU students included Genetics, Neurological Factors, and Difficulties during Birth / Pregnancy. The other objective of this project was to raise Autism awareness, and a fact sheet which was made available to survey participants after completing the questionnaire. Results suggest students are more knowledgeable about Autism than hypothesized.

**68. How Healthy are YOU?** Allison Kendall, Kristy Walker, MaRanda Horton, and Gladys Hernandez (Dr. Lisa A. Appeddu) School of Allied Health Sciences

Being a healthy individual is something most strive for because it allows for a more productive and longer life. However, fast-paced lives can make it difficult to eat well and to exercise. The objectives of this survey were to investigate differences in the eating and exercise habits of college students and community members in western Oklahoma. A survey was conducted using convenience sampling of 50 students at Southwestern Oklahoma State University (SWOSU) and 49 community members in Weatherford, OK, in Fall 2010. This project was done to meet Health Statistics course requirements. Funding was provided by a SWOSU CPGS Organized Research Grant. Our results suggest both groups of subjects consume most calories between 6 am and 10 pm. Both the general and student population

reported consuming foods mostly from the meat, grains and fruit/vegetable food groups. The amount of calories self-reported to be consumed by both groups of subjects was similar. Both subject groups consumed the most calories at home. There was a tendency ( $P=0.09$ ) for students to exercise more than the general population (30 to 60 versus less than 30 minutes per day). Results suggest both students and the general population practice fairly healthy eating habits, but more exercise may be needed in the general population.

69. **Oral Health among SWOSU Students.** Monica Miller and Amanda Kirkpatrick (Dr. Lisa A. Appeddu) School of Allied Health Sciences

Studies suggest chronic gum infection and cardiovascular disease may be related. The objectives of this research were to compare dental habits to recommended standards, to evaluate the association between dental habits and number of cavities, and to determine whether or not having insurance affected dentist visits in students attending Southwestern Oklahoma State University (SWOSU). A survey was conducted in Fall 2010 by using convenience sampling of 43 SWOSU students. This project was done to meet Health Statistics course requirements. Funding was provided by a SWOSU CPGS Organized Research Grant. Survey results suggest 72% of students surveyed brushed their teeth for the recommended twice daily, and 69% reported to brush for 2 or more minutes. Only 36% of students surveyed replace their toothbrushes at the recommended once every three months. We also determined 37% of students flossed once daily and 58% used mouthwash once daily. Other oral hygiene habits included using sugarless gum, water pick, and teeth whitening. Students were more likely to visit the dentist twice a year if they were covered by insurance. On average, college students reported to have between 0 and 4 cavities, with most having none. Low associations were found between brushing and flossing habits as compared with the number of cavities in college students. To conclude, the majority of SWOSU students surveyed met the recommendations in three of the five daily oral hygiene practice. Insurance status was found to be an important factor in predicting whether or not a student would visit the dentist biannually.

70. **Reasons Students Choose the Athletic Training Profession in Oklahoma.** Leah Cox, LaCreta Bowen, and Cesiley Rideau (Dr. Lisa A. Appeddu and Ms. Jessica Young) School of Allied Health Sciences

The Athletic Training Profession is a field with an increasing demand for graduates. It is also changing in its focus, from traditionally being focused on sports to more clinical and educational settings. Therefore, the objective of our survey was to determine the characteristics and influences on students currently pursuing a degree in Athletic Training. Forty-three graduate and undergraduate students who are currently enrolled in Athletic Training Education programs in Oklahoma colleges and universities were surveyed using convenience sampling while attending Oklahoma Athletic Trainers Association (OATA) High School Day on the SWOSU campus. Funding was provided by a SWOSU CPGS Organized Research Grant. Thirty of the 43 students surveyed were female and their ages ranged from 18 to 33 years. Results suggest primary influences for choosing this degree were participating in competitive sports and attending an informative session on Athletic Training in high school. Other potential influences included assisting high school athletics as a manager or student trainer and working with a certified Athletic Training while injured. Results suggest minor influences include a relative working in the field of Athletic Training and attending OATA High School Day as a high school student, which has been offered since 2006. Overall results suggest students are not exposed to the Athletic Training Profession until after entering college, which may explain why only 16 students chose this as their original major and 20 students had already earned a previous degree. Therefore, we believe more recruiting efforts should be geared toward high school students.

71. **Fatty Acids in Beef Cow Milk.** Whitney Sawatzky<sup>1</sup>, Yunshuo Peng<sup>2</sup>, Guadalupe Davila El Rassi<sup>3</sup>, Veneta Banskalieva<sup>3</sup>, Jianping Wu<sup>2</sup>, and Dr. Michael A. Brown<sup>4</sup> (Dr. Lisa A. Appeddu<sup>1</sup>) SWOSU School of Allied Health Sciences<sup>1</sup>; Gansu Agricultural University, Lanzhou, PRC<sup>2</sup>; OSU Food and Agricultural Products Center<sup>3</sup>; USDA-ARS Grazinglands Research Laboratory<sup>4</sup>

The objective of this research is to evaluate the composition of milk fat in beef cows of differing breed composition and on different nutritional regimes. This research is supported by USDA-ARS Grazinglands Research Laboratory; Food and Agricultural Products Center, OSU; Xi'an Vertexe Electronics Technology Co.; and NASA Space Grant Scholarship. Milk fat is synthesized by the cow from dietary nutrients and nutrients incorporated from the cow's body fat. The production of "healthy" milk fatty acids may reflect the composition of the fat found in the calf or cow itself, and can ultimately impact human health upon consumption of the milk and meat. Cows being evaluated are the offspring of Brangus cows crossed with

Hereford (British), Charolais (Continental meat-type), Gelbvieh (Continental dual purpose milk- and meat-type), Brangus (tropically-adapted), Romosinuano (South American), and Bonsmara (South African) bulls. A subset of 24 cows (with four from each breed type) were individually milked during early (May), middle (July) and late (September) lactation in 2009 and 2010. Milk samples (approximately 80 ml) were frozen (-80oC) until prepared for fatty acid analysis. This involved a solvent extraction process to isolate the fatty acids and methylation to produce fatty acid methyl esters which can be analyzed via gas chromatography. Preliminary results from 2009 samples will be presented, and percentages of fatty acid methyl esters will be determined to evaluate the effects of cow sire breed on milk fat composition.

72. **An Analysis of Actions Against Registrants by the Oklahoma State Bureau of Narcotics and Dangerous Drugs: 2000-2009.** Jessica Casselman, Robert Gholson, Meghan Haftman, Jill Floyd, and Antionette Smith (Dr. Benny French) Department of Pharmaceutical Sciences

Objectives: The objective of the study was to analyze the actions taken for a decade of cases against Oklahoma Bureau of Narcotics and Dangerous Drugs registrants in Oklahoma. Methods: Students and faculty visited the Bureau offices in Oklahoma City in Spring, 2010 to review files from 2000-2009. Copies were made of actions taken by the Bureau. Students reviewed and documented information based on a code key. Students entered the coded information into Excel, and the data were exported to SPSS. A frequency analysis was used to generate the results. Results: Half the 119 cases occurred in 2008-2009. MDs, DOs, and DDSs comprised 70 percent of registrants. Half of the cases involved multiple complaints. Abusing controlled substances was the most common complaint. Three-fourths of the cases resulted in a combination of penalties with a financial penalty the most frequent outcome. Sixty-four percent resulted in probation. A third of the registrants had some prescription writing restrictions. Eleven percent of registrants were suspended, while four percent had revoked licenses. Almost one-third had regular drug screens. Ten percent required an impaired professional contract. Conclusions: Three professions made up most of the registrants. Most registrants were charged with multiple complaints resulting in multiple penalties. Most cases ended in probation, and few licenses were revoked. Some registrants faced prescription restrictions, did regular drug screens, and a small group had impaired professional contracts. Half the cases occurred over a two-year period.

73. **Influence Of Soluble And Insoluble Excipients On Drug Release From Hydroxypropyl Methylcellulose Tablets.** Kara Connelly and Michael Pilkington (Dr. Rahmat M. Talukder) Department of Pharmaceutical Sciences

Purpose. To investigate the influence of soluble and insoluble excipients on drug release from hydroxypropyl methylcellulose (HPMC) tablets. Methods. Benecel K4M PH CR (HPMC) was used as the matrix former. Lactose and ethyl cellulose were selected as soluble and insoluble excipients. Naproxen and theophylline were used as the model drugs. The polymers and drug were dry blended according to the composition of each formulation. Matrices were made from the mixtures in a single punch Carver Press at 1500 psi. Dissolution tests were carried out in USP Apparatus II at 50 rpm in 900 ml phosphate buffer at pH 6.8. The dissolution profiles were compared using the similarity factor ( $f_2$ ). SEM photomicrographs of the tablets were taken at different time intervals during dissolution to investigate the gel structure. Results. The average difference in dissolution of theophylline, based on  $f_2$  values, between the formulations containing an identical level of a soluble excipient and an insoluble excipient was about 17%, indicating dissimilarity in release profiles. The difference in  $f_2$  values between the release profiles of naproxen tablets containing a soluble and an insoluble excipient were about 14%. Conclusions. The soluble excipient caused a higher rate and a greater extent of drug release than the insoluble excipient from the HPMC matrix. The soluble excipient is believed to behave as a channeling as well as a wetting agent for the drug particle facilitating its dissolution, while the insoluble excipient remain in the matrix without contributing to the drug release.

74. **Synthesis and Characterization of Pyridine-Armed Reinforced Macrocycles and Their Transition Metal Complexes.** Kevin R. Wilson (Dr. Tim Hubin) Department of Chemistry and Physics

Oxidation catalysts able to perform in aqueous solution under both acidic and basic pH's and at high temperature without decomposing would be environmentally friendly alternatives to current technologies. Transition metal complexes of tetraazamacrocycles reinforced with additional ethylene bridges have produced oxidation catalysts with high kinetic stability under such harsh conditions. 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, several of the known

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 tetraazamacrocycles with a single pyridine pendant arm. Complexation with various first-row transition metals was attempted for both ligands with generally satisfactory results. The synthesis and characterization of the ligands and the synthesis, electrochemistry, and other characterization of their complexes will be presented.

**75. Preparation and Characterization of some Asymmetric Dirhenium-Nitrile Complexes.** Tyler Johnson (Dr. David Esjornson) Department of Chemistry and Physics

The asymmetric dirhenium complexes  $[\text{Re}_2\text{X}_3(\mu\text{-dppm})_2(\text{Ph}_2\text{CHCN})_2]\text{PF}_6$ , where  $\text{X} = \text{Cl}$  or  $\text{Br}$ ,  $\text{Ph} = \text{C}_6\text{H}_5$ , and  $\text{dppm} = \text{bis}(\text{-diphenylphosphino})\text{methane}$ , have been prepared. The asymmetry is between the two Rhenium atoms. One of the Rhenium atoms in the  $\text{Re}_2^{4+}$  core has a coordination number of five; the other rhenium atom has a coordination number of six. The five coordinate rhenium is bonded to the other rhenium, two halides, and two phosphorus atoms from the bridging diphosphine. In addition to the first rhenium atom, the six coordinate rhenium is bonded to one halide, two phosphorus, and two nitrogen atoms. The nitrogen atoms are from the two diphenylacetonitrile ligands. Infrared Spectroscopy, Proton, Phosphorus-31, and Carbon-13 Nuclear Magnetic Resonances, Ultraviolet-visible spectroscopy, Cyclic Voltametry, and electro spray Mass Spectrometry are all in accord with the proposed structure. Compounds of this type have been previously shown to interact with small organic molecules. The relatively sterically demanding diphenylacetonitrile ligand may make a good leaving group in further synthetic work.

**76. Incorporation Of Phenylamine Functionalized Single-Wall Carbon Nanotubes Into Polyimides.** Natalie C. Simpson (Dr. David E. Martyn) Department of Chemistry and Physics

Single-wall carbon nanotubes (SWNT) were functionalized with phenylamine and incorporated into a polyimide. The nanotubes were functionalized via dissolving metal reduction using halophenylamine donor compounds. Lithium metal was used as the electron donor in all reactions. Four different halophenylamines, fluoro-, chloro-, bromo-, and iodoaniline, served as sources of the phenylamine functionality. Spectroscopic and gravimetric analysis of the products revealed significant functionalization and the presence of amine functional groups on the SWNT. The products of these reactions were used as comonomers and incorporated into a polyimide.

**77. Deconstructing the Native Fluorescence Responsiveness of Cytidine-5'-Triphosphate Synthetase.** Kayla Wallis (Dr. Jason L. Johnson) Department of Chemistry and Physics

We seek to gain insight into the allosteric mechanisms whereby CTPS (1) coordinates glutamine hydrolysis (GATase) and transfer of nascent ammonia to acceptor-substrate UTP, and (2) is activated via the binding of GTP. Protein variants have been engineered via site-directed mutagenesis in which each contains only one of the three native tryptophans, with the remaining substituted with tyrosines. The responsiveness of each isolated probe to the binding of ligands will be evaluated to identify modes of inter-domain communication. Construction of the single-tryptophan variants does not compromise the activity or allosteric properties of CTPS. Whereas the fluorescence lifetime of CTPS's intrinsic tryptophans (W276, W419, and W508) do not vary significantly with ligand binding, the average anisotropy ( $r$ ) and exposure of the fluorophores to acrylamide quenching ( $k_{\text{sv}}$ ) are ligand-dependent: (1) the binding of all substrates together with GTP pronouncedly increases anisotropy, suggesting a conformational state in which every tryptophan becomes more restricted against rotation; and (2) the binding of nucleotides UTP, ATP, and GTP decrease  $k_{\text{sv}}$  in almost additive fashion, suggesting a conformational state in which every tryptophan becomes more buried. The allosteric influence of the various ligands appear NOT to follow conduits that are isolatable via the exclusive responsiveness of a given tryptophan probe; rather, global, ligand-induced, conformational changes appear to simultaneously impact all of the probes.

**78. Allosteric Changes in the Oxyanion Loop Accompany the Activation of Amidotransferase Proteins.** Jonathan Walker (Dr. Jason L. Johnson) Department of Chemistry and Physics

Triad glutamine amidotransferase enzymes (GATs) catalyze the coordinated transfer of ammonia deriving from glutamine hydrolysis to an acceptor-substrate within a distant synthetase domain. Catalysis involves nucleophilic attack by cysteine on glutamine to form a thioester intermediate, thus releasing ammonia. A tetrahedral transition state accompanying glutamine hydrolysis is stabilized via H-bonding with residues located within an "oxyanion loop". We seek to determine whether rearrangements of the conformation of this loop are responsible for the allosteric activation of GATs. Our method is to position a fluorescent tryptophan probe into the oxyanion loop of the GAT enzyme CTP synthetase (CTPS) via the genetic construction of Y355W. Changes in lifetime, exposure to quenching, and anisotropy of W355 upon CTPS association with activating ligands thus serve as sensors and descriptors of dynamic changes in the oxyanion loop. It has been hypothesized that GTP, as well as nucleotide substrates, may activate CTPS in part by allosterically ordering the otherwise ill-defined oxyanion loop region around substrate glutamine. Our results indicate that the excited-state lifetime and degree of exposure of W355 to quenching is largely insensitive to ligand binding; however, the dynamic range of motions available to the fluorophore, as reflected by anisotropy, becomes restricted by the binding of the activator GTP and substrate acceptor UTP. ATP, mechanistically required to activate UTP for attack by ammonia, induces no notable allosteric changes in the oxyanion loop. These data are consistent with an ordering of the oxyanion loop at least accompanying, if not responsible for, the allosteric coordination of active sites within CTPS. Funding provided by INBRE, grant #P20RR016478.

79. **Analysis of Oklahoma State Board of Pharmacy Enforcement Actions: 2005-2009.** J. Parks<sup>1</sup>, M. Patten<sup>1</sup>, K. Smith<sup>1</sup>, M. Miller<sup>1</sup>, D. George<sup>2</sup>, A. Wight<sup>2</sup>, and A. Spies<sup>2</sup> (Dr. V. Van Dusen<sup>3</sup>) Southwestern Oklahoma State University College of Pharmacy<sup>1</sup>, University of Oklahoma College of Pharmacy<sup>2</sup>, Texas Tech University Health Sciences Center School of Pharmacy<sup>3</sup>

**Objective:** The first objective of this study was to compile and analyze data from actions taken by the Oklahoma State Board of Pharmacy against licensed registered pharmacists and registered pharmacies during the years 2005-2009. The second objective was to compare and contrast the results obtained in this study with a similar previous study compiled for the years 2000-2004.

**Methods:** Data were collected from all of the available complaints and final orders issued by the Board of Pharmacy from 2005-2009. Pharmacy students also accessed personal files of pharmacists that revealed such data as age, gender, date of registration, and where the pharmacist graduated from pharmacy school. Data from the complaints and Board final orders indicated pharmacist practice settings, location of practice site, if licensees were represented by legal counsel, number of counts per complaint, types of counts within complaints, and penalties issued.

**Results:** The demographics of pharmacists brought before the Board of Pharmacy have remained fairly consistent during the past decade. More pharmacists are obtaining legal counsel when appearing before the Board. Hydrocodone continues to be the most widely diverted prescription drug. Charges against women are remaining consistent even though more women are entering the profession. The average number of years a pharmacist has been licensed that came before the Board remained above 20.

80. **A Grid-Based Adaptive Information Infrastructure to Support the Integration of Faculty Research and Teaching at Oklahoma Regional Universities.** Chris Thornton and Vicky Abernathy (Dr. Warren Moseley) Department of Accounting, Computer Science, and Entrepreneurship

This poster is about a new kind of interoperability and information infrastructure that is based on the coupling of the same principles of Knowledge Management and the Malcolm Baldrige National Quality Award's Criteria of Excellence. This infrastructure will redefine a new adaptive research and development platform for interoperability between faculty in the School of Business and Technology at Southwestern Oklahoma State University and beyond. Web 2.0 technologies introduce a new wave of social interaction through tools such as MySpace, Facebook, Twitter, Delicious and others. The business world is leveraging these technologies to support teams and team building especially where this helps management integrate team building into the enterprise process. Some of the tools used for this are portals, content management systems (CMS - Joomla, Drupal, etc), wikis, blogs, and other types of technology. The idea that learning involves a deepening process of participation in a community of practice has gained significant ground in recent years. Communities of practice have also become an important focus within organizational development and have considerable value when thinking about working with groups. In this article we outline the theory and practice of such communities, and examine some of issues and questions for informal educators and those concerned with lifelong learning.

81. **Parallel and Distributed Image Rendering using Blender on the NSF TeraGRID.** Jarred Frost (Dr. Warren Moseley) Department of Accounting, Computer Science, and Entrepreneurship

This Poster discusses the implementation of a distributed rendering environment (DRE) utilizing the TeraGrid (TeraDRE). Using this system, researchers and students across the TeraGrid have access to available resources for distributed rendering. Previously, researchers at universities and national labs, using high end rendering software such as Renderman Compliant Pixie were often limited by the amount of time that it takes to calculate (render) their final images. A short animation project may be about two minutes in length. At 30 frames per second (fps), this is 3600 frames. An average rendering time for a fairly simple animation can be approximately 2 minutes, resulting in a total of 120 hours just to render a simple 2 minute animation. TeraDRE as of now has been decommissioned from the TeraGrid but with the gracious help of Laura Arns and Preston Smith of Purdue University's Envision Center for Data Perceptualization, Southwestern has been able to acquire a substantial chunk of time on the TeraGrid to extend the TeraDRE project. In this project we focused on how to create usable environment for Oklahoma Regional Universities.

## Podium Presentations

82. **Effect of Drug-Drug and Drug-Polymer Hydrogen Bonding on its Dissolution from Solid Dispersion Formulation.** Dr. Hardeep Singh Saluja, Department of Pharmaceutical Sciences

12:30 PM

Purpose: To investigate the effect of drug intermolecular and drug polymer hydrogen bonding on its dissolution rate from solid dispersion formulation. Methods: Haloperidol, Droperidol and Des-hydroxyl-Haloperidol were used in the study. Unlike Des-hydroxyl-Haloperidol, the former two drugs have hydrogen donor groups (-OH and -NH respectively), which can potentially form hydrogen bonds with PVPK30. Solid dispersions were characterized by XRPD powder diffraction and hydrogen bonding interactions were investigated using FTIR. Results: The solid dispersion formulations of all drugs demonstrated improvement in the dissolution rates, irrespective of the presence or absence of hydrogen bonding with PVPK30 as suggested by FTIR. While the increase in dissolution rate of Haloperidol and Droperidol solid dispersions is attributed to drug-polymer hydrogen bonding, the absence of hydrogen bonding donor group in Des-hydroxyl-Haloperidol in solid state resulted in weak crystal packing and thus exhibited an enhanced dissolution rate. Conclusions: Dissolution rate is influenced by both hydrogen bonding between drug and polymer, and crystal packing of drug molecules in solid state due to presence or absence of hydrogen bonding. Thus hydrogen bonding plays two pivotal but contradictory roles in dictating drug dissolution.

83. **Lanthionine Ketamine Ester's (LKE) Functionality As A Regulator Of Synaptic Transmission And Remodeling.** Taylor Baxter<sup>1</sup>, Erica Benda<sup>1</sup>, and Tyler Hardin<sup>1</sup> (Dr. Andrea Holgado<sup>1</sup> and Dr. Kenneth Hensley<sup>2</sup>) SWOSU Department of Biological Sciences<sup>1</sup>, University of Toledo at Ohio Department of Pathology<sup>2</sup>

12:50 PM

Lanthionine ketamine (LK) is a natural brain metabolite formed from sulfur amino acid metabolism. As no purpose had been demonstrated for this molecule until recently, LK had been considered metabolic waste. However, in recent proteomics studies LK was found to bind to brain proteins involved in cytoskeletal remodeling as well as presynaptic vesicle trafficking. These proteins include collapsin response mediator protein (CRMP-2, UNC-33) and syntaxin response binding protein-1 (STXBP-1, UNC-18) accordingly. Studies were initiated to test the effects of a cell permeable LK-ester (LKE) on presynaptic neurotransmission in a *C. elegans* model system. Subsequently LKE was administered to developing *C. elegans* which were then analyzed for phenotypical changes. First, synaptic function evaluations via motor functional assays in the presence of the cholinesterase inhibitor aldicarb showed that nematodes containing multi-copy punc-17 YFP transgenes and grown in the presence of LKE had a significant decrease in the synaptic signaling as indicated by reduced sensitivity to aldicarb. Studies of the postsynaptic reception confirmed that LKE acts primarily at the presynaptic terminals. Mutant analysis of the molecular mechanism underlying LKE effects showed that reduced aldicarb sensitivity was dependent on expression of normal UNC-18 and UNC-33 proteins. Lastly, imaging examination of whole mounted nematodes containing punc-17 YFP transgenes demonstrated that LKE treatments promote growth and crossover of commissures connecting ventral and dorsal cords. Moreover, preliminary imaging analysis of unc-33 hypomorph mutants suggests that LKE has the capability of rearranging the synaptic commissural network and rescuing defects related to lack of normal UNC-33 isoforms. Taken together, these data provide evidences for in vivo LKE function and unmask new opportunities for therapy development against many neurological disorders associated to abnormal UNC-33 physiology.

84. **Modulating Membrane Fusion in *C. elegans* Synapses.** Melanie Graham, Carissa Fischer, Maggie Yoder, and Cassandra Guthmueller (Dr. Andrea Holgado) Department of Biological Sciences

1:10 PM

Exocytosis is a fundamental mechanism employed by eukaryotic cells for the controlled secretion of substances. In the nervous system, exocytosis mediates synaptic vesicle fusion and neurotransmitter release from nerve terminals. The SNARE proteins, syntaxin, synaptobrevin, and SNAP-25, play a central role in this process. Assembly of these proteins into a ternary SNARE complex is thought to be essential for vesicle fusion in vitro. Progress has been made in identifying the fusion machinery, but the mode of action of SNARE interacting proteins is controversial. Therefore, the focus of our project was to determine the role of *C. elegans* v-SNARE masterprotein1 (VSM-1) in vesicle fusion at the synapse. To this end, we began characterizing the expression pattern of the endogenous VSM-1 in nematodes and the phenotype of vsm-1(ok1468) deletion mutants. Our finding can be summarized as follows: First, immunological analysis of endogenous VSM-1 demonstrated that the protein is enriched at synapses in wild-type nematodes and non-detectable in vsm-1(ok1468) mutants. Second, pharmacological assays

showed that vsm-1(ok1468) mutants have a synaptic phenotype characterized by enhanced sensitivity to “Aldicarb,” a cholinesterase inhibitor. This phenotype can be interpreted as a consequence of enhanced neurotransmitter release and/or increased synaptic connectivity. Third, imaging analysis of synapses showed that vsm-1(ok1468) mutants have abnormal synaptic connectivity. Mutants have a significantly greater density of synapses when compared to wild-type animals. Taken together, these data suggest that C.elegans VSM-1 may play an inhibitory role in vesicle exocytosis affecting synaptogenesis and/or synaptic transmission.

85. **Justifying the Use of Music Therapy in Nursing Homes for Elderly Patients with Age-Related Cognitive Issues: A Proposal for Study.** Melissa M. Burcham (Dr. Sophia Lee) Department of Music  
1:30 PM

With the aging population expanding, there will be a great demand for community based care to maintain a satisfactory quality of life for those deemed unable to care for themselves. This may be due to physical limitations of age, or cognitive decline. Alzheimer’s Disease, dementia, depression, and confusion are all health risks to this population. They can bring agitation, confusion, uncertainty, and can wipe clean an entire life’s worth of memories and relationships with loved ones. Music therapy can be used to promote cognitive and physical activity among clients, engage social interactions with their peers, orient the client to the present, reminisce happy times from the past, foster creativity and promote personal choice and a sense of purpose for the client. Many research studies have been conducted on emotional and psychosocial interventions, of which music therapy is one. Several examples of these approaches are validation, reminiscence and sensory integration (Finnema, E., Droes, R., Ribbe, M., & Van Tilburg, W., 2000) With validation, the therapist operates under the assumption that all the behaviors exhibited by clients have a meaning. Reminiscence can trigger memories from the client’s past and foster group communication. Sensory integration is important to the music therapist—when planning the session, the therapist can select music instruments that can foster tactile and visual stimulation. Music therapy can have a “receptive” side and an “analytical” side. The receptive side can be used in a calming, relaxing atmosphere, encouraging periods of reminiscence. Anxiety and depression can be alleviated, and agitation decreased using this method. The analytical side is used to encourage the stimulation of the remaining cognitive abilities and perhaps spark new interests and expressions. The receptive side is used most often with Alzheimer’s and dementia populations; however it must be applied in a consistent manner to achieve the maximum benefits. During the review of the literature, many studies show that music therapy has to be applied in a steady, constant, and consistent manner to be effective. It is suggested that there be more studies done using music therapy on a very frequent basis with elderly adults who have age-associated cognitive issues.

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