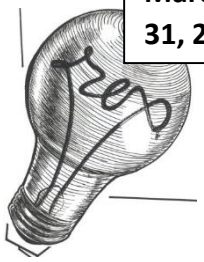
6th Annual USF Research Exhibition Oral Presentations Schedule and Abstracts

Time	Gunderson	Planetarium
5:30	Sara Clark	Spencer Norton
5:50	Andrew Miller	Melissa Buenconsejo
6:10	Cara Wilhelm	Gabrielle Williams

March 31, 2016



Buenconsejo, Melissa. Vaccines: The Natural Solution

Vaccines are a very controversial topic. They are, however, extremely important to society. They are important because they help prevent diseases such as measles, mumps, whooping cough, and the flu, as well as eventually eradicating these diseases just like smallpox was eradicated, and just like polio hopefully will be soon.

Sadly, there are many myths surrounding vaccines, some of which are that they cause autism and other developmental disabilities. There have also been speculations that vaccines will make the recipient sicker if they are received, and that they are immoral in both production and administration. Thankfully, even though these myths are spread very far, there are a lower proportion of people who believe them than who do not believe them. This small population, however, is responsible for a resurgence of sicknesses that could have been prevented or entirely eradicated, such as measles and mumps, which are becoming more and more common.

Vaccines truly are very helpful in many ways, but there are some diseases that don't have vaccines, such as malaria, dengue fever, ebola, and the Zika virus. You will notice that many of these diseases are the ones that the mainstream media puts much stress on, which causes the general public to worry much more than they need to. Diseases such as these generally only affect the populations of young children, the elderly, pregnant women, or citizens who have been immunocompromised. These diseases usually are spread by mosquito or by droplets, which means that general precautions such as bug spray and avoiding contact with a sick person are usually enough to protect oneself.

Clark, Sara. South Africa: Summer 2014

In the summer of 2014, I went on a 3-week trip to South Africa with the group EcoLife, "Vets-in-the-Wild". The goal of the program is to give pre-vet students from all over the world a chance to work with and see the iconic African wildlife, and to see what wildlife veterinary care looked like in South Africa. During my trip I observed and assisted domestic veterinarians and a wildlife veterinarian. The domestic veterinarians worked in the townships, which were constructed during apartheid, and the people never left. This group of veterinarians and animal welfare enthusiasts are among the select few that actually go in to the townships to provide veterinary care to the dogs and cats. It was a truly eye-opening event, and provided us students with a lot of invaluable hands-on and cultural experiences. We also spent just about a week with a wildlife veterinarian, learning about his role in the system. It was interesting to get a behind the scenes look at "ranch life", and how different a ranch in America is in comparison to a ranch in South Africa. I plan on giving a presentation over my experiences, an overview of all the things I learned and the places I went. It will be very similar to the presentation that I gave February of 2015 to the local chapter of the American Association of Zookeepers (AAZK) at the Fort Wayne Children's Zoo.

Miller, Andrew. Austria's Cold War Maxim: What the World Tragically Never Learned

An expert on Austria in the Cold War wrote, "The history of the Cold War and its origins not too long ago was almost exclusively the history of the superpower conflict. American historians…viewed the postwar world almost exclusively from the perspective of Washington and its gargantuan struggle against the Soviet Union."[1] This superpower-centric view is outdated and misguided. Even today as self-anointed soothsayers note a seemingly intractable decline in American prestige, these individuals use as a reference point the Cold War and the fallacious belief that the United States' economic and military prowess went unquestioned. The reality today, as it was in 1960, is that middle to bottom tiered nation-states had tremendous maneuvering room to engineer their own course reflective of their national interest and Moscow and Washington had little leverage to compel those dissenting nation-states.

Austria is an enduring example of one of those dissenting states for any individual seeking to better understand the first decade of the Cold War and the provides the question they must necessarily ask: was the immediate postwar world up through the Berlin Blockade a powder keg just waiting for the first confrontation that would ultimately send Austria and Germany on their paths for the rest of the Cold War? Since the United States and the West "won" the Cold War, German division is usually seen as the only answer to the postwar world. The postwar division of Germany was never the only solution, nor was it always the preferred option by either the United States or the Soviet Union. By comparing the German division to that in Austria, which started in division and ended in sovereignty, there is a propitious opportunity to dispel the argument that German division was the only course of action in the postwar world that was truly viable.

[1]Gunter Bischoff, *Austria in the First Cold War*, 1945-1955 (New York: St. Martin's Press, 1999), 1.

Norton, Spencer. The Mirro Center Advanced Medical Simulation Lab: Transforming Healthcare

The Presentation will highlight and discuss the scope of The Mirro Center for Research and Innovation's Advanced Medical Simulation Lab. Since April 2015, The Mirro Sim Lab has been pushing the bounds of how technology integrates with clinical performance and patient safety. The Mirro Sim Lab features seven patient Simulators, three virtual reality systems, and a virtual dissection table. The Presentation will discuss the unique and cutting edge features of the Mirro Sim Lab patient simulators and virtual reality systems while also relating to the real world applications and benefits of allowing physicians to practice procedures before actually conducting them on patients.

The presentation will discuss the VR systems used at the Mirro Sim Lab and how they allow physicians to use an actual patient CT scan and practice a patient's surgery on the VR system before ever touching the patient, additionally the software used for practicing surgery provides rating tools and training modules to help surgeons improve their performance. Patient Simulators can replicate human conditions with vivid reality, allowing physicians in the Emergency, Anesthesiology, Emergency Medical Services, Radiology, Cardiology, Physical Therapy, and Oncology departments to see exactly how they would perform in real world scenarios such as air embolism, cardiac arrest, seizure, child birth, and more.

The Mirro Sim Lab, located in Fort Wayne Indiana, has begun use of an extracorporeal membrane oxygenation (ECMO) simulator designed by Curtis Life Research (CLR). The ECMO simulator allows advanced cardiovascular teams to practice a life saving measure that has a high degree of risk. The Mirro Simulation Lab is a truly unique facility, combining pioneering technology with medical expertise to revolutionize the healthcare industry, saving lives and money at the same time.

Wilhelm, Cara. Testing the Antimicrobial Properties of Quaternary Ammonium Salt *Berberine chloride.*

E. coli is a bacterium commonly found within human gut microbial colonies, but once it is introduced into an environment through food, it can cause mass illness through an ailment known as food poisoning. If infections are severe enough, patients can succumb to dehydration from diarrhea and vomiting. Typically, preventative measures are taken to reduce the spread of this microbe; people are encouraged to wash their hands when preparing meals, commercial foods are recalled when outbreaks occur, and most gram negative antibiotics are effective at killing this organism. Berberine chloride, a quaternary ammonium salt is a purified form of an extract from the plant family *Berberidaceae*, which includes a common wildflower native to our area: goldenrod. Berberine extract has been used in traditional Chinese herb medicine for the last three thousand years, and it is widely sold over the counter in nutrition stores such as GNC. This is intriguing, due to its purported use as an antibiotic.

The goal of my experiment was to test berberine's efficacy against many bacteria species, including *E. coli*, and *Staphylococcus aureus*, which left unchecked can cause deadly and rare forms of septic shock in humans. Due to *S. aureus*'s ability to resist even our most effective antibiotic, Vancomycin, people are at risk of contracting bacterial infections that cannot be cured with modern medicine. If berberine were to prove effective, through antibacterial and minimum inhibitory concentration studies, against a wide range of bacterial species, we could develop its use further and create newer and more effective antibiotics, slowing the effect of antibiotic resistance on the medical world.

Williams, Gabrielle. Multiple Drug Resistance in Pathogenic Bacteria

Antibiotics revolutionized medicine and patient outcomes. Although in the war against pathogens, our enemies evolve rapidly and we must understand their evolution to improve combat methods to protect our health. Antimicrobial resistance is not uncommon and synthesizing new antibiotics does not seem to be an effective defense strategy. In order to effectively combat pathogens resistant to current antibiotics, we must target the genetic mutations enabling the resistance trait. The purpose of this research is to identify the antimicrobial resistant plasmids in Salmonella. Polymerase chain reaction (PCR) and gel electrophoresis methods were utilized to identify specific gene segments from bacteria cultured in various conditions. Inter-laboratory techniques were utilized to ensure repeatability and increase the accuracy of results. Specific sequenced plasmids are present in antibiotic resistant Salmonella that were not found in the control group. Further investigation of these plasmids is necessary to definitively distinguish their role in resistance. Once determined, abundant research will go into how to best combat multiple drug resistant plasmids in salmonella and various other pathogens.