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**2018**

**WESTERN WYOMING COMMUNITY COLLEGE  
UNDERGRADUATE RESEARCH SYMPOSIUM  
PRESENTER ABSTRACTS**



# Western Wyoming Community College Undergraduate Research Symposium Presenter Abstracts

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## ANTHROPOLOGY- POSTER PRESENTATIONS

### **Composition, Location, and Tribe Origin of Arrowheads**

Ashlee Lazaro

*Faculty Mentor, Dana Pertermann Ph.D.*

The Federal Artifact Repository at Western Wyoming Community College contains many hundreds of regional projectile points that have yet to be fully investigated. We have analyzed portions of this collection to determine if factors such as location, composition, and size of these projectile points can be correlated with tribal origin and age. Based on our preliminary analysis, the vast majority of the collections projectile points come from Southwest Wyoming and are indicative in shape and composition to lithic tools made and used by the Shoshone tribe from 900 AD to the late 15<sup>th</sup> century.

### **Once the Conflict Ends: Building Reuse on the Western Frontier**

Dana Pertermann Ph.D.

While it has been previously argued that conflict has a function of driving innovation, that argument can be seen best on the Western Frontier, such as sights as Fort Bridger, Fort Fetterman, and Fort Laramie, WY . The unique ability of conflict to provide the needed infrastructure for culture change can be seen in comparison to the expansion of missions through the West. The reprocessing of artifacts for use as originally intended for another generation (lateral cycling), or modification of the artifact for a different purpose (recycling) before discarding and becoming part of the archaeological record. In this framework, buildings in the West should be considered cases of both lateral cycling and recycling, from the common reclaiming of materials for both new and original purposes. The ability of Conflict Event Theory to help explain historical modification and culture change in these marginal regions cannot be overemphasized.

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## BIOLOGY - ORAL PRESENTATIONS

### **Assessment of Cardiac Function Using Pressure Volume Loops in Rbm20<sup>-/-</sup> Rats After 28 Days of Angiotensin-II Treatment**

Hanna Ahuja

*Faculty Mentor, Bud Chew Ph.D.*

RNA binding motif 20 (Rbm20), a splicing factor for titin, affects diastolic and systolic properties of the heart per the Frank-Starling mechanism. Failure to alter titin isoform expression from the fetal N2BA to adult N2B in Rbm20<sup>-/-</sup> (KO) rats, impairs cardiomyocyte relaxation, increases ventricular compliance, and dilates the myocardium. Angiotensin II (All) causes vasoconstriction, and cardiac hypertrophy, with increased wall stiffness. We hypothesized that 28 days of All treatment would increase myocardial stiffness, improving cardiac function in KO rats. KO rats and wild type (WT) controls were fitted with subdermal osmotic pumps, delivering All continuously for 28 days. After All exposure, cardiac function was assessed in vivo using pressure-volume loop analysis. Under isoflurane anesthesia, loops were recorded under baseline, brief inferior vena cava occlusion, and hypertonic saline infusion conditions. The rat was then heparinized, and blood collected for cuvette calibration. No group differences were found in cardiac output, heart rate, and stroke volume. However, significant reductions were found in contractility (preload recruitable stroke work), stroke work, and ejection fraction in KO rats. KO rats were able to maintain stroke volume, despite impaired contractility, due to a significant increase in preload and decrease in afterload. Compliance was reduced in both WT and KO rats, when treated with All. We conclude that KO rats failed to improve contractility with 28 days of All treatment, but maintained normal cardiac output through compensatory changes in preload and afterload. We also demonstrated compliance could be altered by All treatment.

### **Assessment of Cardiac Function Using Pressure-Volume Loop Analysis in Mice Chronically Exposed to Volatile Organic Compounds**

Katelin Banks, Isabel Leininger, Austin Houskeeper

*Faculty Mentor, Bud Chew Ph.D.*

Volatile Organic Compounds (VOCs) are ubiquitous, common in mining operations, herbicides, household products, and food. We are likely exposed to VOC daily; chronic exposure causes health problems, especially respiratory. OSHA and WHO set exposure standards for VOCs. However, little research has examined the relationship between VOC and cardiac dysfunction. Our collaborator Dr. Jun Ren (UW Pharmacy School), has observed impaired fractional shortening, upregulated inflammation, and apoptosis in isolated cardiomyocytes exposed to vinyl chloride for five days. We hypothesize that exposure to vinyl chloride will lead to cardiac dysfunction in living mice. Pressure volume (PV) loop analysis allows for beat-by-beat heart parameters including: cardiac output, heart rate, stroke volume, preload, afterload, compliance, ejection fraction, and contractility. A transducer is inserted from the carotid artery into the left ventricle. Baseline loops are collected; then the inferior vena cava (IVC) is exposed. IVC occlusions are performed to obtain preload recruitable stroke work (PRSW), a plot of stroke work over a range of end-diastolic volumes. The slope of this line is the load independent

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measure of contractility. A saline calibration is performed by transiently flushing the heart with hypertonic saline; allowing for subtraction of conductance by the myocardium (parallel conductance). The animal is heparinized, sacrificed, and blood is allocated into wells of known volume; measuring the conductance allows for conversion to volume units (cuvette calibration). Data collection and analysis will be completed by the end of Spring 2018 semester.

#### **Insect Occurrence on Rabbitbrush**

Jadyn Irwin

*Faculty Mentor, Will Clark Ph.D.*

In the harsh weather of Wyoming, only the most resilient plants can survive. Rabbitbrush is a native plant to Wyoming and is one of the main plants that can withstand the long winters of the area. This plant is widespread across most of the western states, as well as reaching into western Canada. A plant with such abundance must hold a key role in our ecosystem, but the significance has seldom been documented. This research is to identify insects that inhabit Rabbitbrush in the Rock Springs area. The importance of this plant will never be fully understood without seeing the kinds of organisms that rely on it for food, shelter, and place for them to reproduce. The specific species of Rabbitbrush chosen for this research is Rubber Rabbitbrush (*Ericameria nauseosa*) and Douglas Rabbitbrush (*Chrysothamnus viscidiflorus*). Researching two Rabbitbrush species will allow for comparison in the biodiversity of insects on each. The goal for this research is to better understand the ecological importance of Rabbitbrush to insects, as well as identify similarities and differences of insect diversity in locations with varying ecological features (ex. body of water nearby, types of trees in the area).

#### **Bee Populations in the Killpecker Dunes**

Rob Hunter

*Faculty Mentor, David Tanner Ph.D.*

The purpose of my research project is to observe and record bee populations in the Killpecker Dunes of Southwest Wyoming. I will be doing research to identify the bee fauna of the Killpecker Dunes. I have yet to identify the fauna and the entire research project will take two seasons. I will also compare bee and plant diversity between dune habitats that do and do not have off-road vehicle usage. The purpose of this is to see if bee populations are greater in areas without vehicle access. By understanding the correlation between bee population and off-road usage in the Killpecker Dunes we can better understand how to maintain the population of bees in Southwest Wyoming.

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## GEOLOGY - POSTER PRESENTATIONS

### **Fluid Dynamics and Tectonic Movement at Sinks Canyon**

Autumn Christie

*Faculty Mentor, Dana Pertermann Ph.D.*

This testing compares and contrasts earlier studies conducted by the United States Geological Survey conducting an experiment on the underground geological formation present between the sink and rise within Sinks Canyon, located in the Wind River Range 50 miles from Lander, Wyoming. Prior studies indicate a 2-hour flow time between the sink and the rise of the Popo Agie River as outlined in the 1973 report presented by the USGS. My Primary findings portray a change within the underground formation. Environmental as well as climate change is thought to be part of the cause for this change within the formation causing a larger time frame between the sink and rise of the Popo Agie River.

## HISTORY - ORAL PRESENTATIONS

### **Silence in a Ghost Town: The Complexity of Child Mortality in Gebo, Wyoming**

Samantha Worden

*Faculty Mentor, Jessica Clark Ph.D.*

A chilling narrative of child mortality ran as the headline news in Thermopolis, Wyoming more than 100 years ago. The story reported that Mr. and Mrs. Kavich's son, at only two and half years old, tragically died in Gebo, Wyoming. On the evening of August 17, 1917, Mrs. Kavich had laid her son down for bed, and proceeded to carry on with her evening chores. Shortly thereafter, a fire broke out in an upstairs bedroom of the family home consuming the house quickly. A child escaped attempting to get help. Unfortunately, the fire incinerated the home too fast. Mrs. Kavich was distraught as she watched the flames engulf her home, with her baby inside. According to the Thermopolis Record news story that ran a week after, Mrs. Kavich found comfort in the fact doctors believed her son did not suffer, as he most likely had died before flames consumed his body.

The Kavich family was one of many in Gebo confronted with the harsh reality of child mortality in the twentieth century. While many stories regarding the loss of children remain silenced in the history of this ghost town, newspapers, memoirs, and epitaphs reveal heartfelt memories of love and tragedy. The varying sources focused on death, reveal the multitude of ways children perished in this coal mining town, such as illnesses and accidents. Historical documents and sites from the 1900s reveal a new, complex narrative of infant, child, and adolescent mortality in Wyoming's history.

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## **United Patriotism: Wyoming's Serbian-American Community**

Carlos Alejandro Gonzalez

*Faculty Mentor, Mark Neels Ph.D.*

On October 10, 1918, an article describing a lavish Thanksgiving feast headlined the Thermopolis Record's front page. The feast was organized by Gebo's Serbians under guidelines of a national group attempting to unite Serbians. The Serbians were extremely grateful for America's help during World War I and therefore wished to express their patriotism and gratitude. After several public speeches, including some given in the Serbians' native tongue, the attendees retired to the Union Hall for refreshments and watched the moving picture, *Civilization*, a Christian film approving the Great War. The article ends with American Colonel George M. Sliney's quote, "Gebo Serbians, we salute you!"

The opportunities for work in Gebo and other communities in Wyoming throughout the decade of the Great War grouped immigrants into several locations compelling them to create their own communities. Because of America's diverging views on immigrants however, Wyoming's Serbians were obligated to adopt new traditions. Nevertheless, these Serbians retained some of the cultural traditions they brought from Eastern Europe, which were some of the most colorful in Wyoming. During the First World War a Serbian American identity was formed establishing an imagined community through the complexity of different customs regarding Serbians in Wyoming's mining communities of Hot Springs and Sweetwater counties.

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## **Superior's Silent Graves: Complexities within Child mortality in a Coal Town**

Samantha Worden

*Faculty Mentor, Mark Neels Ph.D.*

On June 17, 1921, the Rock Springs Rocket covered fourteen-year-old John Arthur Barwick's terrible accident. The front-page article highlighted an incident that took place in Superior, Wyoming's boarding house, Barwick's place of employment. While going down into the cellar to fetch some vegetables, Barwick attempted to brush a light cord out of his way. Unbeknownst to him, a storm the night before caused two power lines to become crossed. Touching the light therefore caused 2300 volts of electricity to course through his body, resulting in numerous burns. In fact, both his hand and his nose were completely cindered. Given the severity of his wounds, the coroner's inquest the next day revealed that he died instantaneously upon connection with the light.

Stories like Barwick's were rampant during the early 1900s, as child mortality was prominent across the United States. However, small mining communities throughout Wyoming noted particularly high numbers. Obituaries and grave markers recount sorrowful stories, as well as hint at childhood death's intricate nature. Illnesses like influenza and scarlet fever took great tolls on children throughout the town, while accidents like Barwick's show a second deadly threat to young lives. Furthermore, sources reveal that these unfortunate incidents affected distinct age groups differently. Altogether, the surviving evidence tells the untold narrative of child mortality in Wyoming's coal towns. In the end, these documents, such as obituaries and death certificates, along with the remains of the numerous communities themselves, show the complexity of child mortality in coal mining communities like Superior, Wyoming.

### **HISTORY - POSTER PRESENTATIONS**

## **Adolescence in Black and White: Recognizing Student Agency in Gebo, Wyoming**

Carlos Alejandro Gonzalez

*Faculty Mentor, Mark Neels Ph.D.*

On March 8, 1938, after a frustrating first half, the Gebo Miners found themselves behind on the scoreboard in one of the season's most crucial games. This small-town high school basketball team was looking to secure their spot in the Big Horn Basin Tournament. The Miners took control of the game during the second half, however, and battled their way to victory. The high-school newspaper, the Gebo Miner, credits the team captain, Art Cunningham, for leading the team to victory and sending them to the regional tournament.

The Gebo Miner, the student newspaper, provides glimpses into the achievements of the 1930s youth from Gebo, Wyoming. This bi-weekly newspaper featured several stories of extracurricular activities and sports. These narratives provided the school and community with benefits, such as the creation of unity and pride. Additionally, teenagers discovered their agency and identity through these activities. Participating on these teams provided students with a distraction from the monotony of a rural childhood, while simultaneously teaching them life skills. In essence, Gebo's teenagers found their own way to express their agency in the Gebo Miner by recounting events of organized school activities, like the pep squad, basketball team, and commercial team.



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## HUMANITIES - ORAL PRESENTATIONS

### **Art and the Environment: How Humanities and Science Come Together to Promote Change**

Kyra Seppie

*Faculty Mentor, Professor Rick Kempa*

How can art be used to advocate for environmental issues? Art and science are often seen on opposite sides of the spectrum; however, they can be powerful when used together. In this presentation we will explore how art can be an effective conversation initiator for environmental issues. The psychology behind why this type of advocacy works will also be discussed.

This presentation will discuss art about plastic pollution, art about climate change, and sustainable fashion. These topics were chosen because they're relatable and everyone is affected by them. By viewing examples of art that focuses on these issues, the public may be swayed to act positively towards environmental issues.

Although some of the art exhibited throughout the presentation may seem to foreshadow a daunting future, that is not at all the case. The art in this presentation is meant to encourage you towards action, not be scared into despair for our beautiful planet. I hope you walk away from this presentation with more knowledge of environmental issues, art that is advocating for them, and what you as an individual can do to make positive environmental change.

## SOCIOLOGY- ORAL/POSTER PRESENTATIONS

### **Race and Racism: Western's Perspective**

Korra Sheldon

*Faculty Mentor, Dana Pertermann Ph.D.*

The issues surrounding race relations in the U.S. have a great deal to do with the lack of education citizens have on this topic. The purpose of this study is to better understand perspectives about race and racism and to see how much people know about this concept. 20 interviews were conducted from students and faculty at Western Wyoming Community College. The interviews consisted of five in-depth questions about race and their experiences with racism. Each interview was recorded on a voice recorder and then transcribed. The significance of this research is to see perceptions that individuals have at WWCC on race and racism, and if there are any trends within this group that can be addressed to improve misconceptions and the experiences of Western students and faculty.