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| **First Place Winners - Oral** | **Name** |
| Natural Sciences and Engineering | Jessica Aldrich |
| **Electromagnetic Resonant Sensor for Bone Health Diagnostics**Faculty Mentor: Dr. Kim CluffCo-Authors: Kim Cluff, Miriam Yassine, Jeremy PattersonCollege of EngineeringNatural Sciences and Engineering Oral Presentation**Abstrac**t: With an increasing aging population and the continual need for advancements in rural medicine, a simple way to diagnose degenerative bone diseases that affect approximately 30% of postmenopausal women in the United States and Europe is necessary. Bone fractures in the aging population are generally attributed to a loss in the bone mass density, these fractures often lead to other complications that aging adults may never fully recover from. The electromagnetic resonant bone health sensor skin patch was developed as a point of care technology for use in limited resource settings such as rural medicine or on the International Space Station (ISS) as a diagnostic device for common health parameters. This technology is a simple, robust sensor that, when interrogated by Radio Frequency (RF) waves, may be able to detect changes in bone density over a period of time. Using a vector network analyzer, an RF wave was sent to the sensor causing electric and magnetic fields to formulate about the patch and return frequency responses unique to the substrate it had been applied to. The shift in the sensor frequency response has been studied throughout the growth cycle of a cell culture and the shift has been correlated to cell growth. A biosafety evaluation has also been conducted and provided results of cell viability over 90% for cells cultured for one week. Using each of these studies the parameters of the sensor will be specified and impedance matched with bone. Future work will focus on studying the individual components of the bone matrix to determine the dielectric properties that contribute significantly to the matrix. |
| Social Sciences and Humanities | Elizabeth Ramirez |
| **THE RELATIONSHIP BETWEEN EATING BEHAVIOR AND SELF-PERCEPTION**Faculty Mentor: Dr. Barbara ChaparroFairmount College of Liberal Arts and SciencesSocial Sciences and Humanities Oral Presentation**Abstrac**t: Eating behaviors and self-perception affect a wide variety of people. Does a person’s eating behavior reflect on one’s self-image? By exploring one’s eating behaviors and self-perception, a potential link between eating disorders and mental state can be established. The current study examines the relationship between self-perception and eating behavior among college students at Wichita State University. An online survey was completed by 66 participants. Participants were recruited through on campus, through social media advertisements, and the SONA portal. The participants’ self-perceptions were assessed using Rosenberg’s Self-Esteem Scale and Mendelson’s Body-Esteem Scale; eating behavior was determined using the Three-Factor Eating Questionnaire (TFEQ-R18). Contributing to research with these variables can help determine students who are at risk to things such as eating disorders. Understanding the factors that lead people into making these unhealthy choices can aid in the production of effective treatment programs. This study explores the relationship between -perception and eating behavior among college age males and females, two variables that can easily disrupt someone’s mental health and lifestyle. If research can gain a better understanding on these risk factors, it can bring society closer to reducing suicide rates, eating disorders, and self-esteem issues. Findings showed self-esteem to have significant relationships with eating behavior, and the BE-attribution subscale within the Body-Esteem Scale. Significant relationships were also found between the BE-appearance subscale and BE-weight subscale. A strong correlation was found between two of the TFEQ-R18 subscales: Emotional Eating subscale and Uncontrolled Eating subscale. |

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| **Second Place Winners - Oral** | **Name** |
| Natural Sciences and Engineering | Mackenzie Freige |
| **A SYNTHETIC MODEL OF THE NICKEL SUPEROXIDE DISMUTASE ACTIVE SITE**Faculty Mentor: Dr. David EichhornFairmount College of Liberal Arts and SciencesNatural Sciences and Engineering Oral Presentation**Abstrac**t: Superoxide dismutase (SOD) is an enzyme that facilitates the disproportionation of the superoxide ion (O2-) into molecular oxygen and hydrogen peroxide. In living organisms, the O2- radical is produced during cellular respiration, and the SOD enzyme is essential to break down this toxin. SODs are classified by the metal ion at their active sites, and one class contains a nickel ion (Ni2+/Ni3+). Nickel superoxide dismutase (NiSOD) is the most recently identified SOD. This project aims to synthesize model complexes of the active site of NiSOD in order to better understand this class of protein. Using 2,2’-dithiodibenzaldehyde (DTDB) as a reactant, a new complex with a Ni(II)-N2S2 active site and a thiolate donor was produced. The model complex will be analyzed to determine its structure and properties. |
| Social Sciences and Humanities | Donald Gering |
| **THE IMPACT OF RELIGION ON DEMOCRACY, TRANSPARENCY, AND GENDER EQUALITY**Faculty Mentor: Dr. Dinorah AzpuruFairmount College of Liberal Arts and SciencesSocial Sciences and Humanities Oral Presentation**Abstrac**t: How does religion influence secular values and modernization? I test several models where religious identity is examined as a possible predictor to support for secular values and modernization. Using a dataset I built in SPSS with data for 170 countries, I employ linear regression to test whether nine measure of religiosity and religious identification correlate with secular values such as freedom, democracy, transparency, and gender equality. I find that those values are less prevalent in countries that give more importance of religion and those where religion is restricted by the government. In contrast, social hostility toward religious minorities and religious identity are not significant factors in explaining those values. |

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| **First Place Winners- Poster** | **Name** |
| Natural Sciences and Engineering | Fayez Alruwaili |
| **BIOLOGICAL MODEL AND QUANTIFICATION OF FLUID CHANGS USING AN ELECTROMAGNETIC PATCH SENSOR**Faculty Mentor: Dr. Kim CluffCo-Authors: Kim Cluff, Jacob Griffith, Jeremy PattersonCollege of EngineeringNatural Sciences and Engineering Poster Presentation**Abstrac**t: Stroke volume (SV) is a critical cardiac output parameter that can offer critical assessments of cardiac function. Utilization of SV measurements can be a valuable tool for early detection for cardio-pathologies, and monitoring pharmacological stimuli in ill patients. Thus, the aim of this study was to develop a non-invasive mobile skin patch sensor - applied like an adhesive bandage which could potentially measure SV. The sensor was designed from a single baseline component comprised of a trace of copper configured into a square planar spiral patch. The sensor was energized by an external radio frequency and produced a resonant frequency response with oscillating magnetic/electric fields which surrounded the sensor. Changes in the magnetic/electric fields due to changes in fluid volume were used to collect stroke volume measurements. An elastic bladder was inserted into the left ventricle (LV) of a bovine heart and a 100 ml syringe was used to simulate stroke volume in the heart. Shifts in the sensorâ€™s resonant frequency were registered as fluid was pumped into the LV chamber. Furthermore, volumetric sensitivity study was conducted to investigate the sensor performance due to different fluid volume increments and to reveal the relationship between fluid volume changes and frequency shifts. An ANOVA analysis followed by a multiple comparison test adjusted for a Bonferroni (alpha =0.05) was done to determine the sensorâ€™s performance in measuring SV. A statistical correlation analysis between the shifts in principal resonance frequency and volume changes were determined through cardiac muscle (R2=0.9849) and in a beaker (R2=0.967). An ANOVA analysis revealed a p-value of &lt;0.01 which indicates the statistical significance of the frequency shifts due to fluid volume increments. This study provides promising data for the ability of an electromagnetic skin patch sensor to be a potential technology for SV measurements in a basic setting. |
| Social Sciences and Humanities | Jamie Wooley-Snider |
| **A FORK IN THE ROAD: INTERSECTIONALITY AND WOMEN'S PATHWAYS TO POLITICAL POWER**Faculty Mentor: Dr. Jodie HertzogFairmount College of Liberal Arts and SciencesSocial Sciences and Humanities Poster Presentation**Abstrac**t: This investigation explores the pathways to power that women navigate in their pursuit of political office. Drawing from published research studies and public data reports, this historical review examines variations in pathways, election rates, and level of office held (local/state/federal) based on women’s unique positions within the matrix of domination, indicating intersections of gender, race, and class when possible. Three research questions guide this study. 1. What are the current levels of representation of women holding political office? 2. What obstacles have been found that hinder women’s entry into public service? 3. What are the various pathways that facilitate women’s entry into political office? Based on data reviewed, while women’s participation in politics has increased, there continues to be a gap in electoral representation, especially among women of color. Pathways to power can be hindered by factors such as media portrayals of female candidates and candidates of color, but may be facilitated through education and/or involvement in activism. Existing research suggests women of color tend to craft less direct pathways to political power, facilitating their entrance through community activism and participation in organizations that advocate social change. Crafting political careers carefully using this experience and leadership, female candidates of color report more confidence in their qualifications for election and ability to lead than their white female counterparts. A higher degree of racial/ethnic identification is demonstrated to produce a higher level of confidence in qualification and ability to lead for female candidates seeking electoral office per the data examined in this study. Conclusions will discuss the need for data about more diverse women. |
| Applied Learning | Sara Harms |
| **WHAT IS A LATE TALKER: A CASE STUDY OF TWIN BOYS**Faculty Mentor: Dr. Kathy StrattmanCollege of Health ProfessionsApplied Learning Poster Presentation**Abstrac**t: Present research is inconclusive on whether or not children who are nonverbal at 2½-years, considered late talkers, will catch up, or if their language development will remain behind that of peers causing them to become known as language impaired. Language impairment greatly affects literacy development and school success.A review of the literature found that at 2½-years, late talkers used fewer than 50 words and had a restricted phonetic inventory, fewer speech sounds. Twins are more at risk for becoming late talkers. Studies of the language of twins, in general, revealed use of fewer words and a more limited expressive vocabulary, than singletons. The purpose of this study was to determine whether or not two twin boys were at risk for becoming late talkers or more seriously, language impaired. Characteristics of late talkers were applied to the communication of two 2-year old twin boys who were nonverbal. Results of standardized tests administered prior to enrollment in a language-based preschool and test results one year later were compared.The twin boys were found to fit the criteria for late talkers. They met the criteria in six of the eight late talker characteristic areas: phonetic inventory, syllable structure, variability in consonant production, error patterns, expressive vocabulary, and use of gestures for communication. Specific results will be presented in this poster. |

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| **Second Place Winners- Poster** | **Name** |
| Natural Sciences and Engineering | Brandon Eckerman |
| **ELECTROMAGNETIC RESONANT SENSOR PATCH FOR DETECTION OF FLUID VOLUME SHIFTS WITHIN INTRACRANIAL SPACE**Faculty Mentor: Dr. Kim CluffCo-Authors: Jacob Griffith, Jessica Aldrich, Kim CluffCollege of EngineeringNatural Sciences and Engineering Poster Presentation**Abstrac**t: Elevations in intracranial pressure (ICP) can result in a number of neurological complications and even death in patients who have had stroke, traumatic brain injury, or have undergone neurosurgical or neurological treatments. These complications can include cerebral hemorrhage, stroke, and irreparable brain damage. The current gold standard in measuring ICP requires implanting an intraventricular catheter into the patientâ€™s skull, requiring invasive surgery and creating unnecessary health risk. Noninvasive methods are also available, but require highly specialized equipment, such as magnetic resonance imaging (MRI), computed tomography (CT), and transcranial Doppler ultrasonography (TCD). These methods are limited to a clinical setting, which hinders their use as a point-of-care technology. This study focuses on developing a point-of-care electromagnetic resonant sensor that can detect a shift in intracranial fluid volume, and then utilize this volume change to estimate pressure. The experimental protocol has been approved by the Institutional Review Board (IRB) of Wichita State University. The electromagnetic resonant sensor is unique in comparison to conventional monitoring systems because it is not made up of electrical components, connections, or batteries. Instead, this biomedical sensor uses a combination of radio frequency waves (RF waves), electromagnetic fields, and a Vector Network Analyzer (VNA) to measure and record physiological parameters that would otherwise require invasive or highly technical methods to detect. In this study, a fluid volume shift was induced by reclining a human subject past horizontal using a commercial grade inversion table. A bio-fluid shift was successfully detected and recorded using the sensor and was validated against TCD measurement calculations. The results suggest that the sensor patch may be capable of measuring intracranial pressure shifts in a point-of-care manner eliminating the need for specialized training and invasive equipment. |
| Social Sciences and Humanities | Mercedes Lubbers-Payne |
| **THE COLONIZATION OF NATIVE AMERICAN RESERVATIONS IN 'TRACKS' AND IN 21ST CENTURY AMERICA**Faculty Mentor: Dr. Jean GriffithFairmount College of Liberal Arts and SciencesSocial Sciences and Humanities Poster Presentation**Abstrac**t: This study is a comparative analysis of the novel *Tracks* by Louise Erdrich to events surrounding the current Dakota Access Pipeline (DAPL) project at the edge of Tribal reservation land, which has spawned the NODAPL movement led by Native Americans. By comparing a story of ongoing colonization and destruction of Native Americans and their reservations with real-life events, this study seeks to show the importance of diverse literature and the influence of literature in depicting the experiences of the minority, while arguing that Native American literature cannot be analyzed through a post-colonialist lens because colonization and ‘Americanization’ of Native Americans is still taking place. Primary sources include the novel *Tracks* and articles pertaining to the NODAPL movement, as there is currently little academic research on the matter. Secondary sources include journal articles on Tracks that analyze the significance and history of Native American reservations. |

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| **First Place Winners - Exhibition/Performance** | Madison White |
| **HYACINTH DAYS: A SHORT POETRY COLLECTION**Faculty Mentor: Dr. Sam TaylorFairmount College of Liberal Arts and SciencesExhibition/performance**Abstrac**t: This short poetry collection, roughly titled â€œHyacinth Daysâ€ follows my own navigation through womanhood and search for an adult identity. Embedded within images, the symbolic process of growing takes place through other things natural and good. These poems aim to serve as a truth without the shadow of many years gone by. As a young woman writing about being and becoming a young woman, my poems attempt to capture feeling, doubt, and life without inhibition. The poems featured narrow in on subjects like virginity, being a daughter, finding an artistic voiceâ€”and possibly losing it. My poetic voice often ranges from whimsical and hopeful to ambivalent and anxious. While many center upon a feminized struggle, the collection encapsulates a very universal human one as well. From love to loss to growing indefinitely, this is one form of looking at life. The works are influenced most directly by my own experiences, but also on the works Iâ€™ve studied in my numerous literature courses. The poems themselves typically go through a process of editing over a span of months which involves trimming most of what is written initially. Many of the poems featured in this collection have also been workshopped by my fellow peers and staff. |