2021 Source

Symposium of University Research & Creative Expression

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NAME: Ro-Ro.
MAJOR: Fine Art

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SOURCE 2021

Symposium of University Research and Creative Expression

Awards

26th Annual Conference

Online in Partnership with the Student Opportunity Center
May 16th-22nd, 2021
The James and Katie Gaudino Scholar of the Year Awards

The James and Katie Gaudino Scholar of the Year Awards for Creative Expression and Scholarly Research acknowledge and reward those students who present at SOURCE and whose work activities and accomplishments provide examples of exceptional dedication to the scholarship experience.

Awardee, Creative Expression:
Alison Banchero, Music Composition

How to Write an Album at CWU - Alison Banchero, Faculty Mentor: Mark Samples (Funded by OUR Grant)
This presentation will outline the process of my senior project here at CWU. The project is an album of original songs that have been written, arranged, recorded, and mixed. There are 9 songs total that vary in instrumentation—from piano and voice to strings, winds, voice, and classical percussion—and genre—from pop to musical theater, jazz, and soul. I will break down the steps of songwriting, revision, development, arrangement, contracting others, organizing recording sessions, and mixing. Audio recordings will also be shared. I will the review some of the unique challenges and lessons learned throughout this process, such as recording during a pandemic, the importance of a positive attitude, diplomacy in the face of administrative issues, and management skills as they pertain to this field of work. It is my hope that this project lays the foundation for future students who choose to take on creative projects in the music department.
Awardee, Scholarly Research:

Kahmina Ford, Physics

**Microtubules, Take the Wheel: A Neuron’s Journey to its Target** - Kahmina Ford, Faculty Mentor: Erin Craig

Neuroplasticity, the ability for neurons to reorganize and form new connections, has major implications for brain trauma recovery and neurological disorders. During nervous system development, neurons extend long narrow fibers called axons that must grow in the correct direction to form neural connections. The microscopic navigators that lead axon extension are called growth cones. These sensitive motile structures at the tip of axons respond to various chemical cues for navigation. In this study, we develop computer-based models to investigate how growth cones respond to external chemical “traffic signals” and guide axon outgrowth. Our model framework builds on previous studies by assuming that a dense network of dynamic filaments called f-actin operate as the engine of the growth cone vehicle. We use this framework to investigate the less well understood growth cone steering mechanism. We introduce long filaments of dynamic biopolymer proteins termed “exploratory” microtubules (MTs) that extend from the axon into the growth cone, randomly switching between states of growth and shrinkage as they “explore” the growth cone leading-edge. Our leading hypothesis is that microtubules respond to external guidance cues by triggering a biochemical reaction, causing the f-actin growth cone engine to engage. The objective of the current model is to investigate the physical role of the exploratory MTs and the mechanisms that bridge chemotactic cues to growth cone turning. By computationally reconstructing the mechanics of the growth cone, we are addressing an essential step to understanding the underlying causes of neurological diseases.

Graduate Scholar of the Year Award

Awardee:

Adrienne Larson, Family and Consumer Sciences

**Maternal Depression Perceived During Adolescence and Attachment Security in Adulthood** - Adrienne Larson, Faculty Mentor: Amy Claridge

Previous literature has found that maternal depression and adversity can decrease the likelihood of the formation of a secure attachment in infants, but few studies have examined the association between maternal depression during adolescence and how it relates to adult attachment security. The purpose of this study was to examine if the perception of maternal depression during adolescence is related to adult attachment security. The current study examined the relationships between perception of maternal depression during adolescence, adult attachment security, and secondary caregiver involvement during adolescence among adults (N = 180) by implementing quantitative survey methods. The results indicated that maternal depression perceived during adolescence was associated with adult attachment security, and that secondary caregiver involvement during adolescence was not a statistically significant moderator. Findings suggest there is a need for more research examining the relationship between maternal depression perceived during later childhood and adult attachment security.
Mentor of the Year Award

Awardee:
Christine Henderson, Law and Justice

Brookes Library reSOURCE Award

CWU Libraries and the Friends of the Brooks Library reSOURCE award is for outstanding use of library resources in your project. This includes books, journals, Archives & Special Collections, databases, library equipment, and even our programs and spaces!

Awardees:

Gerald Lemmon, Sociology
Qualitative Methods for Studying Pre-Exposure Prophylaxis (PrEP) Among Young Queer Men of Color in the US: A Literature Review - Gerald Lemmon, Faculty Mentor: Griff Tester

In the U.S., gay and other men who have sex with men (G/MSM), especially young Black and Latino men of color, are disproportionately impacted by the human immunodeficiency virus (HIV), representing a large percentage of the HIV-positive population and accounting for the bulk of new infections. Pre-exposure prophylaxis (PrEP) is a highly effective HIV-prevention method that includes HIV-negative individuals taking a daily anti-retroviral medication and visiting a medical provider quarterly to test for sexually transmitted infections. Since 2012, when the FDA approved the fixed-dose combination of tenofovir disproxil fumarate and emtricitabine (TDF-FTC), or Truvada, for PrEP, uptake has been increasing, but is still low, and access and use disparities exist among racial and ethnic minority G/MSM. The aim of this systematic literature review is to identify useful qualitative methods for recruiting and studying PrEP among queer men of color. To do this, I examine scientific articles, published between 2010 and 2020, that meet the following criteria: (1) Focus on HIV-prevention, specifically PrEP; (2) Use samples of G/MSM; and (3) Use qualitative data collection approaches. My research questions are: (1) What strategies do PrEP researchers use to recruit and qualitatively study G/MSM? (2) How do the approaches used, and methodological limitations discussed, differ among studies using samples that include white G/MSM and those focused exclusively on G/MSM of color? The findings of this review will help researchers identify methodological barriers to accessing these understudied populations and develop strategies for overcoming these difficulties.
Jannice Cebreros, Law and Justice
Policy Analysis - Solitary Confinement, Civilly Detained Individuals and Bureau of Immigration and Customs Enforcement - Jannice Cebreros, Faculty Mentor: Christine Henderson

In the United States, Immigration and Customs Enforcement (ICE) detention centers are for-profit and privately owned. Privately own detention centers are often affected by profit motives. In ICE detention centers, there are numerous allegations of abuse and unhygienic living conditions. Solitary confinement is a commonly used form of punishment in ICE detention centers, meant to be civil, not criminal. ICE personnel are not adequately trained on mental health and have placed detainees with mental illnesses in solitary confinement, resulting in devastating consequences to both government, institutions, and individuals. The use of solitary confinement on civilly detained individuals has led to controversy concerning the appropriateness of solitary confinement as a form of punishment in civil detention centers and the Eighth Amendment against cruel and unusual punishment in the United States Constitution. Hunger strikes and, unfortunately, deaths have occurred from the amount of abuse and inadequate living conditions that detainees have been subjected to in ICE detention centers. By analyzing the ICE “Placement in Solitary Confinement” policy and the implementation of solitary confinement within ICE detention centers, it is possible to learn more about policy effects on both an institutional and an individual level. This policy analysis provides a secondary analysis review of the discretionary use of solitary confinement in ICE detention centers, the effects of solitary confinement, and alternative solutions to the existing policy.

Taylor Roice, Food Science and Nutrition
The Effects of Probiotics, Prebiotics, and Synbiotics on Measures of Lactose Intolerance: A Systematic Review - Taylor Roice (G), Faculty Mentor: Susan Hawk, David Gee

Lactose intolerance disproportionately affects racial minority groups in the United States, adversely impacting the incidence of calcium deficiency and low bone mineral density in these populations. The nutritional quality of lactose-containing food products incentivizes the investigation of long-term treatment options for lactose intolerance. Modifying the gut microbiome to increase the quantity of lactose-fermenting bacteria in the intestines is a promising avenue of treatment that merits investigation. This modification is typically done via consumption of probiotics, prebiotics, or synbiotics in various forms. This systematic review examined 23 studies measuring outcomes of lactose intolerance in subjects given probiotic, prebiotic, or synbiotic treatments. Bacterial strains with the greatest degree of evidence for symptom and/or hydrogen breath test score reduction were Bifidobacterium longum and Streptococcus thermophilus. Also, the novel galacto-oligosaccharide RP-G28 prebiotic may attenuate adverse outcomes of lactose intolerance.
Angela Kyle, Communication
"I am me. I am not defined by my disability." - Angela Kyle, Faculty Mentor: Terri Reddout
A set of visual stories composed of photographs and capturing portraits of participants. Bringing awareness to my audience that people with disabilities are people first and not defined by their disability. Written descriptions of individuals with name, age, favorite things, and interesting facts about the person. The disability that they have is not discussed in this part of the presentation. Individuals that attend the presentation are asked to think about if they have a connection or common interest with a person introduced. Select details shared that you feel you can relate to and that pushes participants to select an individual introduced to them. Once a person attending the presentation chooses who they feel they have the most in common with or want to get to know more, the visual component to the project is shown. A gallery of black and white photos will complete the presentation with the visual story of everyone. Keep in mind some disabilities are visible, and some are not, and are considered as invisible. The next piece of the presentation is information about the disability and how it relates to them, how they live with it while attending college, working, or raising a family. What information is communicated will depend on everyone's desire to share. Spreading awareness about disabilities, making them less intimidating due to lack of knowledge. Doing that by opening conversations about disabilities. Communication is key when the ultimate goal is awareness. The importance and key factor to grab the audience's attention is a visual story.

America Sanchez, Law and Justice
Women, Prison and Cognition in Washington State - America Sanchez, Faculty Mentor: Christine Henderson
There is a current need to construct gender-based reentry and rehabilitation correctional programs in Washington State. There are differences surrounding men's and women's correctional rehabilitation, such as women having more components that hinder the social support. On average, Washington State incarcerates 796 women per day in Washington's two women's state prisons – Washington State Correction Center for Women (WSCCW) and Mission Creek Corrections Center for Women (MCCCW). Both WSCCW and MCCCW have gender-based restorative rehabilitation programs. However, there are gaps in programming and research where the two Washington women's prison rehabilitative models of personal responsibility are stifled. Future research is needed to examine how personal responsibility models, like prison writing programs, increase success in beliefs, behaviors, and past and future crime pathways. Women who are incarcerated in Washington State could benefit from the psychological actions or practices of gaining understanding through thought and experience that began earlier in life or pre-incarceration. Therefore, the researchers propose a qualitative exploratory approach based on a constructivist paradigm or worldview for the current research. The investigators propose using qualitative interview data collection methods to explore and understand the experiences, beliefs, thoughts, and ideas of implementing cognitive-based programming at WSCCW and MCCCW and pre and post reasoning to crime pathways. The purpose of this study is to gain a better understanding of mental gendered-based cognitive programming. This study aims to develop and create a gender-based cognitive model for pre-and post-incarceration at Washington State women's prison WSCCW and MCCCW.
Presenters: Karla Maravilla, Champagne Ryder, Marisa Villanueva (Africana and Black Studies)

Faculty Mentor: Xavier Cavazos

Title: A Live-Streamed Revolution: Before and After the Camera Cuts

Abstract:
The history of the United States is a history of terrorism against Black, Indigenous People Of Color (BIPOC). From slavery, lynching, and Jim Crow for Blacks, genocide of Indigenous Peoples and theft of their land, to Japanese Internment, Chinese Head Tax and Zoot Suit riots, inhumane treatment of Latinos, the militarization of the border, bigotry, discrimination, and violence has been the historical rule, not the exception. While today there is not expressed racial discrimination in the law, there is violence of hate crimes shown in the recent mass shooting of Asian Americans and Pacific Islanders, border and inland internment, police brutality against African Americans and mass incarceration. This presentation is a response to the hate speech and rise in cultural erasure against marginalized people and the attempt to use domestic terrorism as a method of intimidation to silence their BIPOC bodies. These new young voices speak back, or speak a truth of living under the local news' helicopter's flashlight of domestic terrorism before and after the camera cuts.

Presenter: Matthew Shreve (Music Composition)

Faculty Mentor: Gayla Blaisdell

Title: When I Am with You, a Song Cycle for Queer Love

Abstract:
"When I Am with You, a Song Cycle for Queer Love" is a set of eight love songs composed by Matthew Shreve, featuring the poetry of Imagist poet Amy Lowell (1874-1925). Each song, a moment in time, that follows the loose narrative of a flourishing relationship, from bud to bloom — from the thrill of young love to the building of a nurturing home life. This presentation outlines compositional techniques, a short description of Amy Lowell's life and legacy, and piano and voice performance by CWU alumna Ruth Newkirk.
Presenter: Rachel Brown (English Language and Literature)
Faculty Mentor: Christopher Schedler
Title: Propaganda: Shaping the Gender Role of British Women In World War One
Abstract:
This presentation will address how propaganda altered the gender role of women in Great Britain during World War One (WWI). Often overlooked for their contributions, the women who worked to directly support the war effort on both the home and war fronts were inspired by propaganda that helped to define the role of women in wartime. Not only is WWI often overlooked within the study of war literature, but also the roles and perspectives of women during that time is under researched within the realm of literary study. This presentation analyzes several propaganda posters targeted at women during WWI, and utilizes a gender theory approach to highlight how propaganda both defined and constrained the gendered expectations of women. By examining the propaganda of the time, this presentation reveals that women were crucial to the war effort, and by serving their country through war work, the gendered role of women was altered forever. The larger implication of this study is illuminating the impact that propaganda had then and now on the structuring of gender roles, as well as the need for new research on the diverse literature of WWI, including the work of Evadne Price and Mary Borden, wherein female authors and characters are the focus.

Presenter: Elisabeth Jenkins (Korean Studies Panel)
Faculty Mentor: Volha Isakava
Title: The Heart of Hallyu 2.0
Abstract:
The Hallyu Wave is the name for the increase in popularity of South Korean popular visual culture in other countries. It began with Hallyu 1.0, which was more of a regional growth in popularity, occurring approximately between the 1980s and the early 2000s. This presentation will cover Hallyu 2.0, which occurred more globally starting around 2007 and went through the mid-2010s, at which point, Hallyu 3.0 began. Hallyu 2.0 was a result of South Korea taking advantage of new digital technology and social media, mostly by posting contemporary K-pop music on YouTube, as well adding K-dramas to worldwide streaming sites. In the interests of time, and due to the wide scope of Hallyu 2.0, this presentation will only cover a select group of K-pop idols and one K-drama that were at the heart of this wave, and those are Super Junior, SHINee, BIGBANG, and Boys Over Flowers. All three of the K-pop groups were heavily active during the Hallyu 2.0 time period, and they helped pave the way for later interest in groups like BTS, BlackPink, NCT, and more. Boys Over Flowers is also generally regarded as one of the most iconic K-dramas, and the first K-drama people remember becoming popular in the West. Why were these artifacts of visual culture popular in South Korea? Why did these groups and this show in particular become so popular globally and in the United States in particular? And what effects have they had on visual culture in South Korea and beyond?
Presenters: Zachary Dowdy, Kaylee Cooper (Economics)
Faculty Mentor: Tennecia Dacass
Title: CWU Student Price Index

Abstract:
This project aims to develop a price index of the cost of college living in Ellensburg. To be consistent with the information provided by the Bureau of Labor Statistics (BLS) for the U.S., but more representative of CWU students’ cost of living, we administered a student expenditure survey to collect information on the expenditures and purchasing habits of the average student on the Ellensburg campus. This data provided the weights for the basket of goods purchased during a typical month. We then collected prices of the items in the basket from various stores in Ellensburg to calculate the first measure of inflation. This index’s key strength is its applicability to students who are known to have different spending profiles than the average U.S. consumer. For example, we find that 42\% of the typical student’s monthly expenditure is spent on housing relative to the 33\% reported by the BLS. Our initial findings reveal that the SPI decreased by 0.2 percent in February 2021 relative to the preceding month. The results from this study and future updates are expected to provide useful insights regarding students’ cost of living, which is of immense relevance to university administrators and current and prospective students. This ongoing project should also guide the university administration regarding housing, tuition, and student wage.
Presenters: Alec Brown (Electronic Engineering Technology)
Faculty Mentor: Lad Holden
Title: Cooling Tower Water Treatment Using Programmable Logic Controller (PLC) Project
Abstract:
In water cooling towers used in industrial applications, continual use can lead to scaling, fouling, and corrosion inside the towers. These undesirable effects can lead to expensive equipment repair and plant downtime. This presentation will discuss the process of combating these problems with an automated system run by a Programmable Logic Controller (PLC) that can prevent the listed problems by measuring conductivity, measured in microSiemens per centimeter (us/cm) and monitoring the number of cooling towers active. Furthermore, this presentation will analyze the effectiveness of the PLC bleed and seed system used to lower the conductivity and pH levels of the cooling tower water, and this will be shown by graphing the conductivity level over time, with an emphasis on the regions where the cooling tower treatment is active. This bleed and seed system is controlled by a Proportional Integral Derivative (PID) loop to change the chemical pumps speeds as necessary. The conclusion of this presentation should display the effectiveness of this project and map out the process used to achieve these results.

Presenter: Angela Congdon (Accessibility Studies)
Faculty Mentor: Naomi Petersen
Title: Do Medicare and Medicaid issue wheelchairs that contribute to keeping people homebound?
Abstract:
Medicare and Medicaid only issue wheelchairs to people who need one to get around their own home. If wheelchairs do not have the ability to navigate typical outdoor surfaces or climb slopes such as a standard vehicle wheelchair ramp, they can contribute to keeping people homebound. This project examines how the standards for the specifications of wheelchairs issued by Medicare and Medicaid may limit users’ abilities to participate in activities of daily living outside their home.
**Presenters:** Kendra Gardner, Grace Warren, Isabella Taylana (Education)

**Faculty Mentor:** Bruce Palmquist

**Title:** Kepler's Space Program: Mission to Mars

**Abstract:**
Since 1997, human perseverance has led to multiple explorations of the Martian surface. Now, through a combination of the free programs Octave and Worldwide Telescope, high school math and science students have the opportunity to explore Mars for themselves. This interactive, educational activity introduces Kepler’s Third Law of Planetary Motion and leads students through simplified versions of the real calculations that scientists use to transport rovers from Earth to Mars. Integrated within the activity are visual representations of Mars, along with some defining features and important locations on the surface of the Red Planet. There are four possible landing sites at the end of the activity, and each student will have the opportunity to calculate their way to the location that sparks their curiosity the most. In addition to using the Octave program, students will track information on a guided worksheet, which will also assist the student in their calculations. In the spirit of providing equal access to all students, this free and open source activity is intended to engage large groups of high school students from all backgrounds in the areas of astronomy, physics, and mathematics. Students who complete this activity will have met the NGSS standard, HS-ESS1-4: Use mathematical or computational representations to predict the motion of orbiting objects in the solar system.

**Presenter:** Colton Hague, Tucker Odegaard (Mechanical Engineering)

**Faculty Mentor:** Jeunghwan Choi, Charles Pringle

**Title:** RC Baja Car: Suspension and Chassis

**Abstract:**
An RC Baja car was designed and manufactured to compete in the ASME RC Baja competition. The American Society of Mechanical Engineering (ASME) Baja competition is a time trial that has a variety of obstacles like jumps, rocks, and turns. The objective of the project was to improve the performance of the suspension and chassis while offering a variety of different adjustments that can be made to fit a given terrain. To begin the design process, a benchmark car was selected, and research was performed on trophy trucks to incorporate suspension features into the design. Using engineering methods, analysis was done to determine dimensions, fitments, and materials that would improve the performance. To optimize the performance of the suspension over different terrain types, multiple mounting locations for the front and rear suspension were provided. Using 3D software, the individual parts of the car were modeled and then assembled. With the dimensioned part drawings, manufacturing of the car began. To manufacture the parts, a variety of different manufacturing machines were used such as a mill, 3D printer, and laser cutter. The parts had to be manufactured within tolerance to maintain functionality of the design. A series of tests were completed to ensure the requirements were met. To simulate the RC car being jumped, the car was dropped from a height of 1.5 feet. The suspension of the car absorbed the 192-newton force.
Presenters: Megan Marshall (Accessibility Studies)
Faculty Mentor: Naomi Petersen
Title: The Extent Deafness is Mentioned in Elementary Education Courses at Central Washington University
Abstract:
A large number of deaf and hard of hearing children are enrolled in mainstream education programs and many are taught in general education classrooms, by teachers who have not focused on special education in their teaching programs. In order to find out if Central Washington University orients teaching candidates enrolled in the Elementary Education major to be aware of aspects of deafness such as culture, language acquisition/deprivation, and accommodations, four courses within the major were reviewed. The courses are EDSE: Introduction to Students with Exceptionalities, ELEF 212: Introduction to Teaching in the Elementary Schools, ELEM 333: Inclusive Teaching, and ELEM 443: Teaching in Linguistically Diverse Classrooms. Included in this review were the syllabi objectives and the textbooks used in the courses. The Elementary Education Program at Central Washington University produces a large number of teaching candidates in the state of Washington. As such, the courses that these students are required to take are instrumental in their education as future teachers.

Presenter: Katie Stoen (Education)
Faculty Mentor: Grace Blum
Title: Integrating Arts and Children's Literacy to Create a Culturally and Historically Responsive Classroom
Abstract:
This project will look at one example about how as educators we can design lesson plans that will create a culturally responsive classroom using Dr. Gholncesar "Gholdy" Muhammad's historically responsive framework in "Cultivating Genius: An Equity Framework for Culturally and Historically Responsive Literacy" (2020) through integrating arts and children's literature.
Abstract:
This study aims to understand contraceptive disparities and identify opportunities to improve access to and utilization of high-quality contraceptive care for women who may experience a higher burden of unintended pregnancy and other disproportionate outcomes. The research questions are (1) do Black and non-Black women utilize any form of contraception at similar rates, (2) are there differences in whether or not women are using their preferred (first choice) contraceptive method, by race, and (3) are there differences in contraceptive method type reported between Black and non-Black women. This study used secondary data from an original survey done with non-random sampling fielded from 2014-2015 on family planning experiences of women receiving primary care in a community health center (FQHC) setting. A total of n=2,117 participants recorded responses to survey items, and respondent's use of any FDA-approved contraceptive method was recorded. The findings show that while a majority of women reported using some form of contraception, approximately 1-in-4 women report not using a contraceptive method to protect against unintended pregnancy, and specifically, 1-in-3 Black women reported no contraceptive use. Future research should continue to investigate disparate experiences among Black and African American women receiving reproductive health care and how factors like access, cost, education of both the woman and health care provider, and community perceptions of contraceptive care could all affect disparities in contraceptive use. This study's preliminary look into the racial disparities in contraceptive care creates a foundation for more research surrounding disparities and lack of access to high-efficacy contraceptives.
Presenters: Jessica Craig, Gracie Minks, Adrienne Larson, Amy Claridge (Public Health)  
Faculty Mentor: Tishra Beeson  
Title: Vaccine Intentions and Attitudes toward the COVID-19 Vaccine among Pregnant Women in the U.S.  
Abstract:  
BACKGROUND: Vaccination during pregnancy aids in protecting mothers from serious disease, while the development of maternal antibodies can help protect their babies from serious diseases early in life. This practice is especially critical during a global pandemic. This poster presentation will report on a national survey of vaccine attitudes and intentions of pregnant women during the COVID-19 pandemic.  
METHODS: Utilizing social media platforms, a convenience sample of pregnant women was taken, surveying vaccine attitudes and intentions. Data was also collected for age, race, education, marital status, household size and income, and provider influence. RESULTS: Preliminary data of 110 pregnant mothers surveyed reported that 51.8% (n=57) would definitely receive a COVID-19 vaccination, 10.0% (n=11) would probably receive the vaccination, 8.2% (n=9) were unsure, 16.4% (n=18) would probably not receive the vaccine, and 13.6% (n=15) would definitely not receive the vaccine. Using logistic regression modeling, we were able to determine that, while accounting for individual and household characteristics, individuals whose provider expressly recommended the vaccine were 37 times more likely to report positive intentions to receive a COVID-19 vaccine (adj. OR 37.89, p-value=0.003). Similarly, respondents who reported stronger agreement with items on vaccine safety were over 10 times more likely to report positive vaccine intention (adj. OR 10.3, p-value=0.007) while individuals who reported stronger agreement with concerns about potential harm during pregnancy (adj. OR 0.397 p-value=0.009) and concerns about limited testing of the vaccine among pregnant populations were less likely to report positive vaccine intentions (adj OR 0.22 p-value=0.026).
Presenters: Jacqueline Flaherty (Public Health)
Faculty Mentor: David Gee, Nicole Stendell-Hollis, Susan Hawk

Title: The Prevalence of Underlying Medical Conditions that Increase the Severity of COVID-19 Among U.S. Adults

Abstract:
Individuals with underlying comorbidities and multimorbidity may be at higher risk for severe COVID-19. The purpose of this study is to quantify the prevalence of medical conditions that increase the risk for severe COVID-19 infections using conditions the CDC identified that show sufficient evidence of this association. These results will provide a context for the extent of the U.S. adult population at risk for complications from COVID-19. A total of 10,530 subjects ages ≥20 were used from NHANES data cycles 2015-2018. Underlying medical conditions identified by the CDC that increase the risk of severe COVID-19 outcomes were quantified. The most common comorbidities included hypertension (49% n=5551), obesity (40.7% n=4270), and type 2 diabetes (13.6%, n=1,886). Of the 10,530 subjects, 5,252 (45.2% ±1.1) have two or more COVID risk factors. After stratifying by age group, sex, and race/ethnicity, the prevalence of multimorbidity (≥2 risk factors) was highest among males, adults ≥60 years and non-Hispanic Black adults; Age group (≥60: [67.2%±1.3]; 40-59: [46.1%±1.67]; 20-39: [26%±1.33]; P<0.0001) Sex (males: [47% ±1.63]; females: [43.4%±1.24]; P<0.021) Race/Ethnicity (Non-Hispanic Black: [51.3%]; non-Hispanic White: [46.7%]; Mexican American: [40.9%]; Non-Hispanic Asian: [27.5%]; Other race-including multi-racial: [42.8%] P<0.0001). The results of this study indicate that almost half the population has multimorbidity and HTN. Consistent with the literature, non-Hispanic Blacks, males, and adults ≥60 years may be at higher risk for severe COVID-19 due to higher multimorbidity prevalence.

Presenters: Sydney Davies (Family and Consumer Sciences)
Faculty Mentor: Sarah Feeney

Title: Sibling Closeness after Family Member Death

Abstract:
Previous literature has found that siblings who lose a parent at a young age consider themselves close regardless of contact due to the permanence of losing a parent. Few studies examine the relationship between family member death and sibling closeness among young adults, and tend to focus on one sibling dynamic, limiting generalizability. The current study explores the potential association of family member death on sibling closeness, and the association between family closeness and sibling closeness. Using quantitative survey methods, the current study examined the differences in sibling closeness between emerging adults (N = 402) who reported losing a family member after the age of 12 and those who did not. Results indicated that siblings who did not lose a family member (M = 3.71, SD = .61) were slightly closer than those who did (M = 3.61, SD = .70), though differences were not statistically significant. Among participants who experienced a loss, there was no association between sibling closeness and closeness to the deceased (r = .10, p < .05). Among those who lost a family member, there was a significant association between sibling closeness and family closeness (r = .24, p > .01) and a significant association between sibling closeness and family contact (r = .14, p > .05). Findings suggest more research is required to understand the relationship between family member death and sibling closeness.
Presenters: Adrienne Larson, Gracie Manlow (Family and Child Life)  
Faculty Mentor: Tishra Beeson, Amy Claridge  
Title: Sibling Closeness after Family Member Death  

Abstract:  
Risk factors associated with prenatal depression have been studied extensively, but it is unclear whether typical risks are relevant during the COVID-19 pandemic. This mixed-method study involved surveys and interviews with women in their third trimester of pregnancy to understand prevalence and correlates of prenatal depression during a pandemic event. Survey participants included 378 pregnant women in the United States with due dates between April and December 2020 who self-reported depressive symptoms using the 10-item Edinburgh Postnatal Depression Scale (EPDS). Participants were predominately white, married, and highly educated. A subset of 21 women participated in qualitative interviews. In total, 56.3% of women reported depressive symptoms consistent with clinical levels of prenatal depression. Correlates of depressive symptoms included younger age, unmarried status, lack of access to paid parental leave, feeling unsafe in current romantic relationship, fear and worry about upcoming childbirth, and change in birth plans due to the COVID-19 pandemic. In-depth interviews with participants revealed key themes around pregnant women’s experiences with fear and anxiety, mixed emotions, and grief and loss. These findings underscore the pervasive impact of the COVID-19 pandemic on women during the perinatal period, with specific implications for the care of women with prenatal depression and their families. The heightened potential for prenatal depression in the context of the COVID-19 pandemic is concerning given the potential adverse effects of maternal depression. Practitioners must work together to engage in additional assessment of risks of prenatal depression to ensure support for expecting families is readily accessible.
College of the Sciences
Presentation Award Winners

**Presenters:** Michael Berge (Computer Science)
**Faculty Mentor:** Razvan Andonie

**Title:** Delaunay Triangulation for Outlier Detection and Determining Smoothness

**Abstract:**
Spatial outlier detection is a method used to filter data before processing. There are many different techniques to solving this problem of detection. In this paper we will look specifically at a technique using Delaunay triangulation to both filter the data and give a rough estimate of its smoothness. Outliers skew data and produce unreliable datasets and are caused by a variety of factors. Removing outliers is easily done in one, two, and even three dimensions as you can visualize them. But what about 4-dimensions or even higher? Delaunay triangulation is an algorithm used primarily in mathematics and computational geometry which connects a set of n-dimensional data points in such a way to create a mesh of evenly spaced, non-overlapping triangles. This was used in a paper by Min-qi Zheng in 2008, which used this method to calculate and detect spatial outliers in a data set, which he called DT_SOF, or Delaunay Triangulation Spatial Outlier Factor. My research has been implementing an algorithm to find a way to determine the smoothness of a set of data. There were different methods tested such as projection using the cross product of vectors, the random cut algorithm, standard deviation, but in the end all failed. To achieve the smoothness factor of a dataset, the data is first pre-processed through the DT_SOF algorithm and then calculated using the sum of Delaunay edges divided by the number of data points, which has proven to be the best way to calculate smoothness so far.

**Presenters:** Jorge Garcia (Chemistry)
**Faculty Mentor:** Timothy Beng

**Title:** Charting the Chemical Reactivity Space of Castagnoli-Cushman-Derived N-Heterocyclic Sulfones

**Abstract:**
N-heterocyclic sulfones are present in many pharmaceuticals, including antityrpanosomal drug Nifurtimox. There is therefore an increasing demand for methodologies that create N-heterocyclic sulfones. This is all the more necessary since drug-resistance issues continue to persist, and there is a decreasing number of potent compounds isolated from nature that tend to satisfy the demands of high throughput screening. This project has achieved a cheap, site-selective, and orientation-selective protocol for constructing N-heterocyclic sulfones. The novel sp3-enriched compounds have considerable structural diversity. Moreover, the approach is highly modular and afforded highly functionalized N-heterocyclic sulfones bearing synthetically useful functional groups such as alkenes, alkynes, and aldehydes. This library of N-heterocyclic sulfone compounds will undergo structure-activity relationship (SAR) studies via an in-house collaboration with Dr. Dondji, with a focus on neglected tropical diseases.
Presenters: Gerald Lemmon (Sociology)
Faculty Mentor: Griff Tester
Title: Qualitative Methods for Studying Pre-Exposure Prophylaxis (PrEP) Among Young Queer Men of Color in the US: A Literature Review

Abstract:
In the U.S., gay and other men who have sex with men (G/MSM), especially young Black and Latino men of color, are disproportionately impacted by the human immunodeficiency virus (HIV), representing a large percentage of the HIV-positive population and accounting for the bulk of new infections. Pre-exposure prophylaxis (PrEP) is a highly effective HIV-prevention method that includes HIV-negative individuals taking a daily anti-retroviral medication and visiting a medical provider quarterly to test for sexually transmitted infections. Since 2012, when the FDA approved the fixed-dose combination of tenofovir disoproxil fumarate and emtricitabine (TDF-FTC), or Truvada, for PrEP, uptake has been increasing, but is still low, and access and use disparities exist among racial and ethnic minority G/MSM. The aim of this systematic literature review is to identify useful qualitative methods for recruiting and studying PrEP among queer men of color. To do this, I examine scientific articles, published between 2010 and 2020, that meet the following criteria: (1) Focus on HIV-prevention, specifically PrEP; (2) Use samples of G/MSM; and (3) Use qualitative data collection approaches. My research questions are: (1) What strategies do PrEP researchers use to recruit and qualitatively study G/MSM? (2) How do the approaches used, and methodological limitations discussed, differ among studies using samples that include white G/MSM and those focused exclusively on G/MSM of color? The findings of this review will help researchers identify methodological barriers to accessing these understudied populations and develop strategies for overcoming these difficulties.
**Presenters:** Rebecca Mitre (Geography)  
**Faculty Mentor:** Megan Walsh  
**Title:** Reconstructing the post-glacial fire history at Waterdog Lake, Oregon, using charcoal analysis of a lake sediment core  
**Abstract:**  
In the past decades, wildfires have been growing more intense and frequent in the Pacific Northwest (PNW). An example of this was the 2020 wildfire season during which numerous communities were displaced and millions of dollars worth of damage was done. In order to better understand the current pattern of wildfires, we must determine what past wildfire activity was like in various regions of the PNW. The goal of this research was to reconstruct the fire history for the Waterdog Lake watershed. This study site exists in a mid-elevation, mixed conifer forest in western Oregon, which is an under-studied region in the PNW in terms of fire history. We reconstructed the fire history for the post-glacial period (last ~15,000 years) using macroscopic charcoal analysis of a 5 meter-long lake sediment core extracted from the site in 2012. Radiocarbon dates were obtained from the sediment core to create an age-depth model and the charcoal data were plotted to show the trends in fire activity. The primary research question in this study was: “How and why has fire activity changed at Waterdog Lake in the last ~15,000 years?” The results of this research show greater fire activity during the last several thousand years of the record as compared to earlier. Data from this site will help contextualize current rises in fire activity in this area, and can further be used to piece together a greater understanding of the post-glacial fire history of the PNW as a whole.

**Presenters:** Kim Nguyen (Sociology)  
**Faculty Mentor:** Paula Collucci  
**Title:** Outdated Expectations of Women in Vietnamese Traditions Via "Truyện Kiều" and Its Impact on Women Nowadays  
**Abstract:**  
Truyện Kiều is written by Nguyễn Du, who is one of the most prestigious poets in Vietnam. This poem is written in the early 19th century based on a Chinese novel, Đoạn Trường Tân Thanh, by Thanh Tâm Tài Nhân. In Truyện Kiều, as well as many other Vietnamese or Chinese literature, the principles of Confucius root deep in the societal morals since centuries ago. Even nowadays, Confucian principles are still the core of Vietnamese education system. Through analyzing the culture and research about the Vietnamese society then and now, this paper breaks down how the patriarchal principles of Confucius have built a culture that has such high standards and expectation on women while not providing them any resources. This is a close focus on the suffer and hardship of many Asian women, and the responsibilities they have to maneuver through life while keeping up with the cultural standards, especially ones related to gender roles and being a "proper lady".
Presenters: Mary Powers (Geological Sciences)  
Faculty Mentor: Lisa Ely  
Title: Assessing Weathering of Vertical and Horizontal Limestone Tombstones in Washington State  
Abstract:  
Rain, wind, and other processes modify Earth’s landscape and rock material over time. Examining tombstone weathering is a way to measure the weathering rates of rock. The date listed on the tombstone provides the approximate year that weathering started. The limestone tombstones examined in this study are especially susceptible to chemical weathering by acid rain, which is created by fossil fuel combustion. While some might think tombstones are a permanent reminder of their loved ones, over the years they can become difficult to read due to the weathering processes. To discover which tombstones show more weathering, vertically oriented tombstones and horizontally oriented tombstones were examined from multiple graveyards using a visual weathering classification system. A total of five cemeteries were visited in Yakima, Ellensburg, Leavenworth in central Washington, and Black Diamond in western Washington. The goal was to sample 500-1000 tombstones older than the year AD 1930 within these cemeteries. I hypothesized that vertically oriented tombstones would show more weathering than horizontally oriented tombstones, because vertical tombstones are more exposed to wind whereas horizontal tombstones are protected from wind. However, preliminary findings suggest that horizontal tombstones show more evidence of weathering than vertical tombstones. A contributing factor to this observation could be that moisture stands on horizontal tombstones for longer periods, allowing more time for the chemical weathering reaction. By sampling from both central Washington and western Washington one can gain an understanding as to whether acid rain weathering is more prevalent in wetter or dryer climates.

Presenters: Raeanne Tegman (Biological Sciences)  
Faculty Mentor: Gabrielle Stryker  
Title: Prevalence of Rocky Mountain Spotted Fever in Kittitas County Ticks  
Abstract:  
Rickettsia rickettsii is a pathogenic bacterium that causes Rocky Mountain spotted fever in individuals who have been the recipient of a tick bite. Rocky Mountain spotted fever causes fever, headache, rashes, and can be deadly in those who do not receive proper treatment. In the North Eastern part of the United States, tick surveillance is a common method used to identify the prevalence of pathogenic bacteria. In Washington State, however, the detection of this pathogenic bacterium is primarily based on human incidence. My project focused on identifying the prevalence of R. rickettsii in the Kittitas County tick population. Methodology include dragging known tick areas for collection of specimens, donations of ticks from local residents, and DNA sequencing for detecting pathogenic bacteria. The ticks collected were identified by comparison of mouth and body signatures to known species, which resulted in the identification of two tick genera, Ixodes and Dermacentor. After DNA extraction, Polymerase Chain Reaction (PCR) was performed in order to identify the presence of R. rickettsii. Results confirm the presence of this bacterium in at least one tick. A number of ticks indicated the possibility of infection, but more research must be done in order to confirm.
Presenters: Rachel Davey (Biological Sciences)  
Faculty Mentor: April Binder  
Title: Mice Mice Baby! Cold-induced metabolic changes in lean, transgenic mice  
Abstract:  
Obesity is a multifaceted metabolic disorder with severe worldwide public health consequences. While obesity can often be treated using diet and exercise, there are complex genetic interactions driving obesity that don’t always respond to such changes. One important research focus for addressing genetic factors is activating brown adipose tissue which increases thermogenesis, the process of burning stored fats to generate heat. Cold exposure is a known way to activate brown adipose tissue through B3-adrenergic signaling. This signaling pathway causes an upregulation of thermogenesis in brown adipocytes and beige adipocytes, which is white adipose tissue that “browns” and becomes metabolically active. In this study, transgenic mice that constitutively express the human non-steroidal anti-inflammatory gene 1 (NAG-1) were used as a model to further understand the mechanisms of increasing metabolism. At room temperature, NAG-1 mice have less adipose tissue, higher metabolic rates, and longer lifespans than their wildtype littermates. Wildtype and NAG-1 mice were subjected to a prolonged cold exposure at 10ºC for seven days. The metabolic rates of the mice were measured before and after cold exposure using respirometry. Quantitative real-time PCR has also been done to measure expression of genes associated with thermogenesis in adipose tissue. Changes in expression levels can indicate the upregulation or downregulation of thermogenesis. The data from these analyses will help to inform whether NAG-1 acts synergistically with the B3-adrenergic stimulated response or not. Further downstream targets of NAG-1 in conjunction with cold exposure can be identified for possible therapeutics to treat obesity.

Presenters: Cody Kuster, Natalie Amos, Tahlia Lopez, Alex Reimann (Psychology)  
Faculty Mentor: Heath Marrs  
Title: School Psychology Recruitment  
Abstract:  
The field of School Psychology has shown a shortage of practitioners across the nation. With that, applicants to graduate schools are needed more than ever to help fill the gap of the shortage. Our research team wanted to see whether the knowledge of the field of School Psychology helped determine whether undergraduate students would be applying for School Psychology graduate programs depending on their class in undergrad. The study also looked at if the factor of whether the participants knew who their School Psychologist was during their time in primary and secondary school, and if that may contribute to their decisions of applying for School Psychology programs in the future. Participants were asked to fill out a survey to help assess their knowledge of the different Psychology fields/graduate programs as well as their choice intention to apply/enroll into School Psychology Programs. The participants consisted of 372 undergraduate students at Central Washington University.
Presenters: Tyler Ussery (Psychology)
Faculty Mentor: Ralf Greenwald
Title: The Neuroscience of Mental Health
Abstract:
COVID-19 has affected our world in countless ways, but most of all, the virus has encouraged reflection in most areas of humanity. One of the most pressing global issues currently is mental health. An overall ambiguous term, mental health encompasses several areas of the human experience. As scientific study rapidly develops, new information regarding behavioral neuroscience and genetics has introduced the opportunity for individuals to develop personal “best practices”. This presentation is designed to provide an overview of how our “ancient brain” interacts with a modern lifestyle. Specifically, major brain regions and neurophysiology will be introduced in relationship to mental illness, motivation, and general homeostasis. The interplay between diet, exercise and use of technology in relation to mental health will also be explored.

Presenters: Brett Vagt (Biochemistry)
Faculty Mentor: Todd Kroll
Title: The development of cell culture techniques to investigate the role of Emx2 in neocortical arealization
Abstract:
The neocortex is a structure unique to mammalian brains and mediates conscious thoughts and actions. This structure contains four primary areas that processes discrete types of information: motor output and auditory, visual, and somatosensory (touch) input. Although these functional areas are separated by discrete boundaries shortly following birth, these clear boundaries are nonexistent during embryogenesis. The development of these boundaries (a process called neocortical arealization) is partially mediated by a variety of transcription factor proteins produced in gradients across the developing neocortex. These include the homeobox protein Emx2, which is one of the most studied proteins involved in this process. Emx2 is produced across the developing neocortex in a high posterior-medial to low anterior-lateral gradient. This gradient influences the boundary positions between the neocortical areas. Emx2, however, is not sufficient on its own to mediate this process. The Kroll lab focuses on the identification of novel binding partners for Emx2 that may assist with proper neocortical arealization. This strategy has led to the identification of four primary proteins of interest: Cnot6l and three isoforms of Quaking-I (Qkl). The objective of this project has been twofold. First, to develop and implement procedures for mammalian cell culture, transient transfection, and RT-qPCR, for use in the Kroll lab, to further investigations of novel protein-protein interactions. Second, to investigate a potential mechanism for the regulation of p27KIP1, by Emx2, through interactions with Cnot6l and/or any of the quaking isoforms.
Thank you to our judges, along with the award selection and SOURCE committees for their support of the SOURCE 2021 program!

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And finally, we would like to thank our Alumni College Day Speakers!

Bridget August

Dr. Cassandra Nikolaus

Matthew Conrardy

Jadvir Gill