



Mid-Atlantic Regional Conference
for Undergraduate Scholarship

MARCUS

AT RANDOLPH COLLEGE



SATURDAY, OCTOBER 12, 2019

Welcome to the 21st MARCUS!

We at Randolph College are proud to be hosting you for this fun and rewarding event. Whether you are a presenter, a faculty sponsor, guest or auditor, we are pleased that you are joining us!

The **Mid-Atlantic Regional Conference of Undergraduate Scholarship (MARCUS)** was founded and hosted by Sweet Briar College from 1999-2018. Since its inception, MARCUS has attracted students from colleges throughout Virginia and surrounding states, who present their research in oral and poster sessions during the daylong event.

The conference atmosphere is one of lively inquiry in which the student researchers are the experts, presenting to an audience of their peers. Unlike many conferences, MARCUS is purposely interdisciplinary, with an emphasis on the intersection of disciplines across the liberal arts spectrum.

For instance, one presentation session may include students in history, economics, political science and anthropology, all sharing a research interest in globalization. In another session, the common topic may be preserving species habitats and include presentations in biology, environmental studies and philosophy.



You are welcome to explore the rest of our beautiful campus.



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schedule

8:30-9:30am: Breakfast/ Registration *Hampson Commons, Main Hall Lobby*

9:30am-12:15pm: Oral Presentations *Student Center, Psychology Building*

12:25pm-1:20pm: Lunch *Cheatham Dining Hall*

1:30pm-2:45pm: Oral Presentations *Student Center, Psychology Building*

3:00pm-4:00pm: Poster Presentations, *Hampson Commons, Main Hall Lobby*

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SATURDAY, OCTOBER 12, 2019

ORAL PRESENTATIONS SESSIONS I-XII

Session I: 9:30- 10:45am, Nichols Theatre

9:30 Darius Chernitsky, Randolph College
9:45 Jeremy Bradshaw, James Madison University
10:00 Emily Donlevy, Roanoke College
10:15 Rosa Bello, Sweet Briar College
10:30 Paige Edwards, Randolph College

Session II: 9:30- 10:45am, Quillian Conference Room

9:30 Theresa Carriveau, Sweet Briar College
9:45 Emily Dougherty, University of Lynchburg
10:00 Brooke Fife, James Madison University
10:15 Marilyn Cardenas-Paredes, Virginia Military Institute
10:30 Sophia Cabana, James Madison University

Session III: 9:30- 10:45am, Psychology 101

9:30 Maggie Groetsch, Sweet Briar College
9:45 Myles Peckham, James Madison University
10:00 Jared Boone, Roanoke College
10:15 Mary King, University of Lynchburg

10:30 Elainah Elkins, James Madison University

Session IV: 11am- 12:15pm, Nichols Theatre

11:00 Kenny Nguyen, James Madison University
11:15 Yasmin Bekri, Sweet Briar College
11:30 Adele Weaver, University of Lynchburg
11:45 Chloe Keefe, James Madison University
12:00 Ekaterina Shaltaeva, Christopher Newport University

Session V: 11am- 12:15pm, Quillian Conference Room

11:00 Spencer Law, James Madison University
11:15 Nathaniel Willis, Roanoke College
11:30 Ian Dors, Christopher Newport University
11:45 Haley McAllister, James Madison University
12:00 James Mozingo, Hampden-Sydney College

Session VI: 11am- 12:15pm, Psychology 101

11:00 Nicholas Mays, James Madison University
11:15 Stephanie Zemba, Roanoke College
11:30 DaZane' Cole, Sweet Briar College
11:45 Tiffany Parra, James Madison University
12:00 Amanda Mathis, Christopher Newport University

12:25-1:20PM: LUNCH CHEATHAM DINING HALL

schedule

1:30-2:45PM: ORAL PRESENTATIONS SESSIONS VII-IX STUDENT CENTER AND PSYCHOLOGY BUILDING

Session VII: 1:30–2:45 pm, Nichols Theatre

- 1:30 Hailey Gilman & Joseph Vazquez, Randolph College
- 1:45 Paul Hanna, James Madison University
- 2:00 Griselda Vasquez Ramirez, Sweet Briar College
- 2:15 Miranda Touchstone, James Madison University
- 2:30 Kaleigh Callis, James Madison University

Session VIII: 1:30–2:45 pm, Quillian Conference Room

- 1:30 Allyson Scott, James Madison University
- 1:45 Alex Kulvivat and Jdody Misidor, Randolph College
- 2:00 Julie Horton, Sweet Briar College
- 2:15 Charles Abraham, James Madison University
- 2:30 Ashani Parker, University of Lynchburg

Session IX: 1:30–2:45 pm, Psychology 101

- 1:30 Henry Ford, James Madison University
- 1:45 Emily Wandling, Sweet Briar College
- 2:00 Mary Connell, James Madison University
- 2:15 Taylor Dominique, James Madison University
- 2:30 Dylan Danelson, James Madison University

POSTER SESSION, 3:00-4:00PM, HAMPSON COMMONS, MAIN HALL LOBBY

- 1. Emma Coogan, Roanoke College
- 2. Kasey Cooper, Roanoke College
- 3. Johanna Enzmann, James Madison University
- 4. Keyu Jin and Priscilla Ranjitkar, Randolph College
- 5. Genevieve Lewis, Christopher Newport University
- 6. Stephen Mitchell, James Madison University
- 7. Elizabeth Tafoya, James Madison University
- 8. Hannah Brown, Christopher Newport University
- 9. Lauren Chadwick, Christopher Newport University
- 10. Alexander Conway, Randolph College
- 11. Taylor Craft, Randolph College
- 12. Kyle Darmstead, Christopher Newport University
- 13. Lauren Davis, Christopher Newport University
- 14. Lindsey Evans, Parker Moore, and Zemariah Sanders, Mary Baldwin University
- 15. Emma Friedmann, Christopher Newport University
- 16. Karyn Heisig, Randolph College
- 17. Brandi Houck, Christopher Newport University
- 18. Mary Jobe, Christopher Newport University
- 19. Rebekah Jones, James Madison University
- 20. Leif Kvarnes, Randolph College
- 21. Cat Stricklin, Hollins University
- 22. Zachary Swanson, Christopher Newport University
- 23. Qian Zhao, James Madison University

presentations

Session I: 9:30-10:45 a.m., Nichols Theatre

Darius Chernitsky '20, Randolph College, *TLC fingerprinting of chamomile*, Advisor: Ann M. Fabirkiewicz

Chamomile is an herb well known in the western world as a bedtime tea. Chamomile tea can be found almost everywhere that tea is sold and is regulated as a nutritional supplement. Nutritional supplements are not well regulated, so adulteration can be a concern. Thin layer chromatography (TLC) is a fast and efficient technique that can detect components in a mixture. TLC fingerprinting uses a combination of solvents and conditions to create a series of plates that uniquely identify the plant. In this research, TLC fingerprinting was used to characterize pure chamomile, as well as chamomile essential oil. Other commercially available products were also fingerprinted and compared with our stock to determine the presence of chamomile or other contaminants.

Jeremy Bradshaw '20, James Madison University, *Morts pour la France: French African colonial forces in the second world war*, Advisor: Raymond "Skip" Hyser

Manpower has long been an important resource for nations at war. A steady flow of men to the front lines can be as important to a country's military infrastructure as victory and defeat on the battlefield. For many nations in the Second World War, armies were raised from colonial holdings. Colonial powers including the French and British drew upon subjects in India, Southeast Asia, and Africa, to supplement their domestic armies. The latter experienced a unique campaign in North Africa and an even more volatile front in Western Europe. Their experiences in recruitment, during combat, and as prisoners of war, exemplify the major themes of the Second World War; racism, prejudice, and brutality. African troops, specifically black Africans, were subjugated by their superiors and despised by their enemies. Their experiences provide an illustration of European treatment of African colonial subjects, and foreshadow independence movements of the 1950s and 1960s.

Emily Donlevy '21, Roanoke College, *Kant with Sade: A look beyond desire*, Advisor: Brent Adkins

In his essay, "Kant with Sade," twentieth century philosopher and psychoanalyst, Jacques Lacan, examines the works of two prominent thinkers to illustrate his own claim regarding the nature of man. This project strives to elucidate ambiguities within this essay by contextualizing it within other psychoanalytical works including Lacan's own *The Mirror Stage as Formative of the I Function* and Sigmund Freud's *Beyond the Pleasure Principle*. Through approaching Kant with Sade in conversation with other thinkers, Lacan's claim that something beyond desire motivates human activity is both clarified and strengthened. Sources: Lacan, Jacques, and James B. Swenson. "Kant with Sade." October 51 (1989): 55-75. doi:10.2307/778891. Lacan, Jacques, and Bruce Fink. *Ecrits: The First Complete Edition in English*. New York: W. W. Norton & Company, 2006. Freud, Sigmund. *Beyond the Pleasure Principle*. London: Penguin UK, 2003. Lacan, Jacques, and James B. Swenson. "Kant with Sade." October 51 (1989): 55-75. doi:10.2307/778891.

Rosa Bello '20, Sweet Briar College, *The development of an integrated automatic water quality sampler*, Advisor: Bethany Brinkman

Samplers can gather more accurate samples than manual sampling to understand how a lake/river's water quality is affected by weather, flow, and other variables. This project seeks to add additional functionality and automation to an automatic water sampler designed in 2015. Sensors that measure parameters of water quality and air quality were added along with connecting the sampler to the internet.

Paige Edwards '21, Randolph College, *Understanding the role of benthic microalgae in seagrass response to heat stress*, Advisor: Sarah Sojka

Seagrass is important for coastal ecosystems. It provides habitat and food, stores carbon, and protects shorelines. Five percent of seagrass is lost each year (Waycott et al 2009). Climate change causes much of this loss. Even short term temperature increases can cause seagrass die backs. Benthic microalgae (photosynthetic organisms that live in sediment) are an important part of seagrass ecosystems. Benthic microalgae regulate nutrient cycling, providing nutrients for seagrass. Benthic microalgae also produces extracellular polysaccharides which are slime like substances that bind sediment together. This keeps the sediment from making the water too cloudy for seagrass to photosynthesize. Because benthic microalgae is essential for the survival of seagrass, it is important to know how it responds to heat stress. Lab experiments have found that benthic microalgae is less abundant above 24° C (Cartaxana et al 2015). This study explores the effects of heat stress on benthic microalgae in a natural environment. Sources: Cartaxana, P., Vieira, S., Ribeiro, L., Rocha, R. J. M., Cruz, S., Calado, R., & Marques da Silva, J. (2015). Effects of elevated temperature and CO2 on intertidal microphytobenthos. *BMC Ecology*, 15(1), 1-10. <https://doi.org/10.1186/s12898-015-0043-y> Waycott, M., Duarte, C.M., Carruthers, T.J.B., Orth, R.J. et al (2009) Accelerating loss of seagrasses across the globe threatens coastal ecosystems. *Proc Natl Acad Sci USA* 106:12377-12381

Session II: 9:30- 10:45 a.m., Quillian Conference Room

Theresa Carriveau '21, Sweet Briar College, *A look at the history of athletics, field hockey, and lacrosse at Sweet Briar College from 1930-1970*, Advisors: Lynn Laufenberg (Sweet Briar College), Katie Glaeser (University of Lynchburg)

Using archival documents, I found that there was a strong promotion of female intercollegiate athletics at Sweet Briar during a time when governing bodies of women's athletics released options that were very disapproving of highly competitive female athletes. As a result, instances of varsity women's intercollegiate athletics were rare in U.S. colleges and universities prior to the 1970s. However, Sweet Briar did not listen to these statements of disapproval; they continued to hold intercollegiate athletic contests and advocated its benefits. Thus, Sweet Briar was truly "ahead of the game."

Emily Dougherty, University of Lynchburg, *Intraspecific divergence in yellow perch, *Perca flavescens, Advisor: Takashi Maie**

Many teleosts exhibit intraspecific variation that often correlates with differences in resources and habitat. We evaluated the extent of intraspecific variation in yellow perch, *Perca flavescens*, from two lakes (a mining-influenced lake vs. a spring-fed lake) that present substantial ecological differences (calcium bioavailability, pH, and visibility). By examining their body morphology, we evaluated how certain morphological traits correlate with functional demand during predator escape behavior and contribute to intraspecific divergence. We expect, in the context of predator-prey interaction that perhaps occur at the different proximity, that body morphology adaptively change in the way that certain components of locomotor design in yellow perch contribute to enhance their predator escape performance, such as depth and width of the caudal fin; therefore, fitness of the population.

Brooke Fife '21, James Madison University, *Heroes and villains: stolen art in World War II*, Advisor: Michael Galgano

This paper examines art looting, art preservation, and art recovery, in Europe during World War II. Art looting and art preservation was done primarily by three main groups: the Soviet Union, Nazi art theft organizations, and the Monuments Men/Allied forces. Through the use of U.S. military documents, an autobiography, and photographs, the presentation argues that each group thought they were the heroes or villains of their stories. Yet, ultimately they fell somewhere in between.

Marilyn Cardenas-Paredes '21, Virginia Military Institute, *Do positive messages about others' recycling behavior motivate or de-motivate your own efforts?* Advisor: Jillian Stuart

This experiment served the function of testing between the influence of moral licensing/goal progress and social norms on an individual's environmental behavior. In our study, 309 participants received a message indicating that rates of recycling have increased, decreased, or no information about the rate of recycling was provided. Participants were then asked how likely they would be to engage in a variety of pro-environmental behaviors in the future. We predicted that participants who were given a message that showed progress toward environmental goals (i.e., increasing recycling behavior) would demonstrate a decreased intention and motivation to recycle as compared to the other two conditions. However, a one-way ANOVA on the participants' future behavioral intentions revealed no significant variation among the three conditions. It is still important to ensure messages with the goal of encouraging pro-environmental behavior are not inadvertently decreasing sustainable behavior. Therefore, ways to improve the study are discussed.

Sophia Cabana Dec '19, James Madison University, *One state under many gods: exploring the roots of religious freedom in Virginia*, Advisor: Raymond "Skip" Hyser

Prior to the creation of the United States, Virginia was already locked in an intense political battle between religious liberty and religious establishment. Thomas Jefferson and James Madison viewed the radical new doctrine of religious freedom as a basic right, but they had to work against centuries of entanglement between the Anglican Church and the Virginia government in order to extend this right to their fellow Virginians. With the passing of the Virginia Statute for Religious Freedom, Jefferson and Madison finally ended a decade-long struggle toward religious liberty that had been brewing during the American Revolution. The Statute was a break from the traditions of Europe and represented a decisive moment for Virginia, as well as the future American Republic, but historians still debate its actual meaning, as well as the extent of religious liberty and to whom the Statute applies this right.

Session III: 9:30- 10:45 a.m., Psychology 101

Maggie Groetsch '22, Sweet Briar College, *Layer by layer nanostructures manipulated by optics*, Advisors: Kaelyn Leake and Hank Yochum

During this summer research project, we created and investigated layer-by-layer nanostructures using a laser to modify the thickness of each layer. In particular, we focused a laser beam at a substrate as we produced nanostructures. Parameters such as laser power and material properties were altered and then the structure of the film was analyzed to determine the effects of the modifications. To analyze the results we used visual comparison along with UV absorption spectrometer to determine the structure, surface smoothness, and thickness of the substrate.

This allowed us to determine changes in optical properties, surface structure, and depth, variables my teammate used to explore the changes in optical properties and the effect of material properties on waveguides. The intended use of our results will be to design more complex systems such as waveguides and other patterned devices.

Myles Peckham '21, James Madison University, *Publius and factional threat: how the republic acts as a safeguard against faction*, Advisor: Steven Reich

In "The Federalist No. 10," James Madison posits that the greatest threat to the proposed new government of the Constitution, and to the public good, lies in the oppression of the minority by majority factions. He believes factions will naturally emerge due to the liberty afforded to citizens under the Constitution and because the zeal for different opinions is "sown into the nature of man." Thus, "Publius" claims that the proposed government must guard against the effects of factions, rather than the causes. Through examination of The Federalist Papers No. 9 and 10, as well as writings from known Anti-Federalists, it is clear that the threat factions pose to the newly proposed republican form of government was the core topic of debate in the ratification of the Constitution among the state conventions, particularly in the state of New York. Sources: Alexander Hamilton, James Madison, and John Jay, ed. Lawrence Goldman, *The Federalist Papers* (New York, Oxford University Press: 2008), 50.

Jared Boone '20, Roanoke College, *Power structures and political tradition: an explanation for the disparate healthcare outcomes between the United States and France*, Advisor: Bryan Parsons

The United States and France have distinctly different healthcare systems and these differences are shown in many areas, including coverage outcomes and in spending as a percentage of GDP. It is unique that two western Republics with very similar systems of governance, values, traditions, and interests on the world stage have created such different systems. This presentation seeks to answer the question of why. To do so, I use two theoretical frameworks to explain the development of each system and then go over some qualitative data collected from interviews

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Mary King '20, University of Lynchburg, *The effect of media influence on perceptions of the self*, Advisor: Virginia Cylke

The general purpose of this research was to determine the effect of media image exposure (thin-ideal, body positive, or neutral) and gender, on an individual's self-esteem, body satisfaction, and thin-ideal internalization. The ultimate goal of the research was to examine these factors in populations that have not been studied at length in the past relating to body image, such as male and transgender participants. Participants watched a short video consisting of 12 images (thin-ideal, body positive, or neutral), and then completed three questionnaires relating to each of the dependent variables. The following predictions were made: scores in thin-ideal internalization were expected to be higher in all of the gender categories when exposed to thin-ideal images, and lower when exposed to body positive images; scores in self-esteem and body satisfaction were expected to be higher in all gender categories when exposed to body positive images, and lower when exposed to thin-ideal images; and scores in the group exposed to neutral images were predicted to have no significant difference in any dependent variables across gender categories.

Elainah Elkins '21, James Madison University, *Freedom summer: reshaping racial relations and advancing civil rights in America*, Advisor: Raymond "Skip" Hyser

Young and idealistic volunteers participated in 1964's Mississippi Freedom Summer Project with the hope of bringing "freedom" to African Americans through voter registration and education reform in the most racist, segregated state in America. Despite the successes and failures of the project, Freedom Summer drastically shaped American civil rights. For the first time, white and black Americans lived, worked, loved, and struggled together. After surviving several months of brutality and adversity, privileged volunteers were able to understand the hardships and oppression of African Americans more than any white person in America had before. Their letters home, testimonials after their experience, and personal journals all reflect the ways in which the project changed their attitudes. Freedom Summer was able to bring national attention to the extreme injustice, racism, violence, and poverty in Mississippi as well as progress and reshape societal outlooks and racial relations for both black and white Americans.

Session IV: 11:00 a.m. -12:15 p.m., Nichols Theatre

Kenny Nguyen '21, James Madison University, *Natural language processing for visualizing the Mueller report*, Advisor: Michel Mitri

Our research was conducted using NLP (natural language processing) programming to develop a Story Analyzer that read and analyzed the text of the Mueller Report. Story Analyzer utilizes Stanford's CoreNLP Java library to perform information extraction on a story and uses D3 and Google JavaScript visualization APIs to generate a dashboard of interconnected data visualization. The text then would be categorized into a visual dashboard of people, places, actions, and times. D3 also generated visuals such as a word cloud and a map of the places described in the text. Story Analyzer helps individuals answer the question of: Who, What, When, Where? Source <http://storyanalyzer.org/>

Yasmin Bekri '20, Sweet Briar College, *Solar powered workstation design and installation*, Advisor: Bethany Brinkman

The presentation aims to provide insight into the progress of the 2019 Sweet Briar College Summer Honors Research Program - Solar Powered

Workstation project. The designed off-grid photovoltaic system (PV) is expected to generate at least 656 Wh per day. The PV system will be supported by a user-centric, nature-inspired structural mount and workstation area. The installation is to provide a convenient outdoor working/ convening and charging area that blends into the campus' natural context and its historic architecture. Furthermore, it serves to be a beacon of sustainability and seeks to promote awareness of renewable energy sources to the Sweet Briar College community.

Adele Weaver '20, University of Lynchburg, *Effects of sexual orientation of female professors on student perceptions of leadership style and teaching effectiveness*, Advisor: Alisha Marciano

The goal of the study was to determine whether student knowledge of the professors' sexual orientation and leadership style influences what students perceive about their leadership behaviors and effectiveness in the classroom. The independent variables were sexual orientation and leadership style. The dependent variables were perceived leadership style and perceived leadership effectiveness. The leadership framework used is the transformational/laissez faire model first proposed by Burns (1978). Transformational leaders are much more involved than Laissez-faire leaders. They typically lead with charisma and always take input from their followers. Laissez-faire leaders are less involved, offering guidance only when necessary. Undergraduate students completed a survey electronically, where they viewed a photograph and description of a hypothetical professor. The description included information about the professor's sexual orientation and leadership style. They then answered questions pertaining to their perception of their leadership behaviors and effectiveness. It is hypothesized that the homosexual professor will be seen as exhibiting a Transformational leadership style and is a more effective leader. Source: Burns, J.M. (1978). Leadership. New York: Harper and Row.

Chloe Keefe '21, James Madison University, *Organized labor and the anti-Chinese movement*, Advisor: Steven Reich

When Chinese immigrants initially came to the United States in search of job opportunities, they were praised for their diligent work ethic. They seemed to work longer and harder than the native-born American, while being paid less. However, as more Chinese began to immigrate, their industriousness became a threat to the American worker, who felt like employers were passing them over in favor of cheap foreign labor. In order to "protect the dignity of labor," labor unions combined race and labor issues to create a powerful crusade against the Chinese that ravaged the West Coast during the Gilded Age.

Ekaterina Shaltaeva '21, Christopher Newport University, *Optimizing school bus routing using modified Clarke-Wright Heuristic*, Advisor: Robert Hasbrouck

The objective of this project is to develop and implement an algorithm allowing creation of school bus routes. Offices of Transportation in different counties in the US are faced with problem of assigning bus stops to routes at the beginning of every year. The number of students waiting at each stop can vary greatly, ranging from one to over twenty. When assigning stops to routes, the Office of Transportation must be mindful of two limitations. First, each bus has a fixed capacity, so number of students picked up should not exceed it. Second, each bus route travel time should not exceed one hour. In most counties the task of assigning bus stops to routes is performed manually, which makes the process extremely time-consuming and sub-optimal, resulting in too many routes being created. The goal of this research is designing a mathematical algorithm allowing effective assignment of bus stops to routes.

Session V: 11:00 a.m - 12:15pm., Quillian Conference Room

Spencer Law '20, James Madison University, *Silence=Death: ACT UP and AIDS activism in the United States, 1981-1996*, Advisor: Raymond "Skip" Hyser

On the heels of the sexual revolution, an unknown virus swept through the gay community in major cities across the United States. By 1989, more than 40,000 people had died from this virus, now known as HIV/AIDS, and President Reagan left office without ever addressing the issue. Despite the urgency of the epidemic, drug research and development stalled in the FDA's laboratories. People with AIDS knew they were running out of time. Gay men on the verge of losing everything: their jobs, lifestyles, and even their lives, joined with thousands of others to form activist organizations. The AIDS Coalition to Unleash Power (ACT UP) and the Treatment Action Group (TAG) notably led the charge to end AIDS through demonstrations, protests, and policy development. While there remains no cure for the virus, the persistence of AIDS activists brought an end to the plague of a generation.

Nathaniel Willis '20, Roanoke College, *Religion and politics in the Middle East: comparison of Christians in Lebanon, Egypt, and Israel/ Palestine*, Advisor: Jonathan Snow

The relationship between religion and state is an important component of the political dynamic of the countries of the Middle East and North Africa. While Islam is the predominate religion in these areas, Christian minorities play a notable role in the region. These communities include the Coptic Christians of Egypt, Maronite Christians of Lebanon, and the numerous Christian churches in Israel and Palestine. Using comparative analysis, this research evaluates how each community directly participates in the governing bodies of their respective countries.

Ian Dors '20, Christopher Newport University, *Optimization of bus stops using clustering methods*, Advisor: Dmitriy Shaltayev

The goal of this research project is to optimize the procedure of creating school bus stops and assigning students to them. In many US counties, the beginning of the academic year in public schools is associated with substantial preparatory work. One of these activities is deciding where the bus stops will be located and which students will be assigned to each bus stop. In the vast majority of counties, this labor-intensive task is done manually and therefore, often results in a sub-optimal distribution of bus stops. If too many bus stops are created with too few students assigned to them, then this will result in the scheduling of additional bus routes to pick up students and will take more time. The county Office of Transportation will then need to spend additional funds for more buses, drivers, gas and maintenance. The focus of this research is two-fold: (a) automate the task of creating bus stops and assigning students to them, and (b) minimize the total number of stops required, resulting in fewer bus routes. The project goals will be addressed by utilizing clustering algorithms which will allow grouping of students who live close by each other and assigning a bus stop for them. When the clustering technique is developed, the second part of this project will be to implement this proposed algorithm in a software using a combination of Python and JavaScript.

Haley McAllister '21, James Madison University, *Degenerates: compulsory sterilization in Virginia, 1880-1940*, Advisor: Raymond "Skip" Hyser

Between 1880 and 1940, negative eugenics reigned in Virginia through legal compulsory sterilizations of inmates. Those with low IQs, a lack of emotional intelligence, and criminals, were labeled "feeble-minded" and "degenerates" and were considered for sterilization. Doctors forcibly prohibited these people from reproducing and spreading these undesirable qualities through procedures that removed reproductive organs. Following the 1924 Virginia Sterilization Act, the Supreme Court case of *Buck vs. Bell* (1927) determined it was constitutional to forcibly sterilize inmates and did not violate the Fourteenth Amendment, which protects individual's rights from state intervention. Many justifications for negative eugenics, including race betterment and economics, allowed these procedures to continue legally for years. This paper uses state government documents and court cases to examine the arguments for the sterilization of approximately seven thousand Virginians.

James Mozingo '22, Hampden-Sydney College, *Crowdfunding social ventures: evidence from India*, Advisor: Indu Khurana

Traditionally, entrepreneurs have taken a relatively standardized route when establishing and funding their business. However, as entrepreneurs enter the information age, more non-standard approaches to business development and financing are becoming realistic solutions to overcoming some of the traditional barriers entrepreneurs have faced in the past. This paper analyzes the crowdfunding as a new and novel method of financing traditional and social ventures. Using data from Ketto.org, the most prominent Indian platform, this article examines two central questions concerning charitable crowdfunding, first, which type of projects get funded and second, which entities receive maximum funding. We further analyze the average number of backers and narrative of the successful campaigns.

Session VI: 11:00 a.m - 12:15pm, Psychology 101

Nicholas Mays '20, James Madison University, *Blumenbach's legacy: the creation of caucasian identity through exclusion of the Japanese*, Advisor: Steven Reich

In the early 20th century, common knowledge held that "Caucasian" meant a white person. However, the reverse was not necessarily true, and this complicated philosophy persisted until 1922 when the Supreme Court handed down a statement that legally made it so. A Japanese man, attempting to apply for American citizenship was denied because he was not considered a white person, and so the Court said he was therefore not Caucasian. This was the first time that "white" was legally stated to mean "Caucasian," officially absorbing this popular notion into legal vernacular. The verdict was influenced significantly by prejudices held toward the Japanese. That prejudice towards a (now, legal) non-white group was influential in the creation of modern white racial identity.

Stephanie Zemba '21, Roanoke College, *Elderly immigrants and social isolation: experiences and coping strategies*, Advisor: Meeta Mehrotra

As people grow older, social support becomes more crucial to their health and overall well-being. Immigrant elders are more vulnerable to social isolation, as they often face additional barriers to retaining meaningful social relationships as they "age out of place" in a foreign land. Challenges to remaining socially connected include limited English proficiency, cultural differences, and geographical separation from kin and close friends. This study aimed to examine whether and how social isolation and loneliness are experienced by foreign-born elders living in a non-urban area in Southwest Virginia, with few well-established ethnic communities. A preliminary analysis of 13 semi-structured, qualitative interviews with foreign-born elders revealed that maintaining family relationships in the U.S. and abroad was among the most important strategies used to lessen social isolation and feelings of loneliness. Future research should examine health concerns and focus more directly on how the experiences of refugees differ from immigrant elders.

DaZane' Cole '20, Sweet Briar College, *Investigating the role and importance of O-antigen in the betulin-mediated killing of Pseudomonas aeruginosa*, Advisors: Abraham Yousef and Michael R. Davis Jr

Pseudomonas aeruginosa is an opportunistic bacteria and is ubiquitous in the environment. *P. aeruginosa* has both innate and acquired resistance to antibiotics, making it difficult to treat. Lipopolysaccharide (LPS) is found in the outer membrane of Gram-negative bacteria and is involved in protection from host immunity and antibiotics. LPS is composed of lipid A, core oligosaccharide and O-antigen, which is comprised of repeating sugar units of various lengths and is important in its pathogenesis. Due to *P. aeruginosa*'s antibiotic resistance, new treatments are needed. Betulin, an antimicrobial compound found in birch tree bark, has been previously shown to kill *P. aeruginosa*. We have mutant strains that make O-antigen of differing lengths or not at all. We determined that these mutants grow at similar rates, and will expose the O-antigen mutants to betulin and betulin-derived compounds in order to determine what role, if any, O-antigen plays in protection from these derivatives.

Tiffany Parra '21, James Madison University, *Kindertransport: how children were affected during and after the long journey to safety*, Advisor: Michael Galgano

While Hitler's Nazi regime was in power, Jews were extremely targeted. However, German Jews curated many programs from within the government in order to save themselves. One of these such programs was the Kindertransport. The Kindertransport helped thousands of children leave the country and find a family to stay with during the war. This paper examines the children both during and after their escape from Germany to the United Kingdom. Their lived experiences and accounts provide insights into the micro-aggressions and discriminations that they faced in their new environments. Sources like newspapers and the contents of suitcases were used when curating this paper.

Amanda Mathis '20, Christopher Newport University, *A principal components analysis for the development of a brief dark tetrad measure*, Advisor: Sherman A. Lee

While long surveys can provide an abundance of data, they come at the cost of response error from participant fatigue, valuable time loss, and muddled trait distinctions (Saucier, 1994). In order to produce a short measure of the dark tetrad personality traits, I conducted a series of principal components analyses on the items from the Short Dark Triad (Jones & Paulhus, 2014) and the Short Sadistic Impulse Scale (Meara, Davies, & Hammond, 2011) using data from a sample of college students (N = 413). The results produced three-item long scales that measure Machiavellianism, psychopathy, narcissism, and sadism.

12:25- 1:20 p.m. Lunch Cheatham Dining Hall

Session VII: 1:30 -2:45 p.m., Nichols Theatre

Hailey Gilman '21 and Joseph Vazquez '20, Randolph College, *Analyzing Alvin Lucier's "I am Sitting in a Room," : a potential measure of resonant frequencies*, Advisors: Katrin Schenk and Randall Speer

Alvin Lucier's "I am Sitting in a Room" is an experimental music composition in which a sound in a room is recorded and its recording is played back until, according to Lucier, the resonant frequencies of that room are amplified. We collected data using a modified version of Lucier's method for various sounds, including the monologue written in his score, performances in singing and flute, and pink noise. We used SciPy, Matplotlib, and MATLAB to process the data from our resulting sound files. We seek a method to quantify our data as well as to develop a theoretical model to better understand the underlying mechanisms regarding Lucier's method. This project was funded by the 2019 Randolph College Summer Research Program.

Paul Hanna '20, James Madison University, *Examining the failure of the German missile program during the Second World War*, Advisor: Michael Galgano

From the beginning of World War II, German scientists and engineers developed the first missiles and rockets to gain advantages on the battlefield. This was the first technology that would allow a military to bomb long-range targets with high explosives without risking troops. However, due to the lack of funding and support for the program, competition between military branches, and attempts made to destroy or capture the rocket sites by the Allies, the missile program inevitably failed to achieve its primary mission. This research examines post-war accounts from the missile engineers, historical analysis, research dissertations, and diaries from German officials.

Griselda Vasquez Ramirez '22, Sweet Briar College, *Initial fabrication of optical waveguide structures using laser engraving and layer-by-layer self-assembly*, Co-author: Maggie Groetsch '22, Advisors: Kaelyn Leake and Hank Yochum

The purpose of this project was to test a preliminary design of an optical waveguide in glass by combining two approaches- commercial laser engraving and layer-by-layer self-assembly. The commercial laser engraver can etch the surface of a glass structure, creating tracks in a glass microscope slide. Layer-by-layer self-assembly can be used to add polymer structures with controlling index of refraction after laser engraving. An initial wave guide structure was characterized using the cutback method to characterize loss. This presentation will discuss our early results on this process.

Miranda Touchstone '20, James Madison University, *The hypocrisy of the Nuremberg Trials in relation to medical experimentation*, Advisor: Raymond "Skip" Hyser

During WWII, the Nazis performed a variety of experiments without consent. Many of these experiments were tortuous, but they were not the only ones conducting such tests. Many of the more advanced countries around the globe conducted dangerous experiments on those considered inferior races. The history of medical ethics in the 20th century is complicated, and despite various unethical experiments, only the Nazis were put on trial at Nuremberg and held accountable. After comparing medical experimentation in Germany, Japan, the US, and Australia during the 1940s, it seems the biggest difference in who was punished was largely based on getting revenge against those who tortured their European allies. No one seemed to care the Japanese tortured the Chinese and no one seemed to consider pointing the finger back at their own country.

Kaleigh Callis '21, James Madison University, *The CIA's madman: the true motives of the CIA's involvement in the 1953 Iranian coup*

In 1953, the CIA orchestrated the overthrow of the entire Iranian government under the nationalist, democratic politician, Mohammed Mossadeq, and eliminated the potentially democratic regime with Shah Pahlavi, monarch turned dictator. However, most documents pertaining to the operation have been destroyed, diminishing any chance to know the truth of these events. Why the secrecy? What was the motive? Some say Cold War strategy, others say oil. Was it imperialism disguised as democracy? The deleted documentation leaves many gaps concerning the coup permanent, only fillable by way of memoirs and historical imagination. Thus, primary sources from the CIA's leader of the Middle East Division, Kermit Roosevelt, and leader of the psychological division of Operation AJAX, Donald Wilbur, help determine the potential intentions of the agency's involvement. Regardless, United States foreign policy, as well as transparency and trust between the agency and the public, were forever tarnished by the Iranian Coup of 1953.

Session VIII: 1:30 -2:45 p.m., Quillian Conference Room

Allyson Scott '21, James Madison University, *Education in Nazi Germany*

In 1933, Hitler became Chancellor of Germany causing the Nazi party to rise to power. After the enabling act of 1933, Hitler was able to change the laws in Germany to reflect the Nazi ideology. Many of his laws affected the German youth, because he saw them as the future of the Nazi party. To force this loyalty to the Nazi state, the education system was re-shaped. In the new Nazi education system, intellect was de-emphasized while physical education was more stressed. Every subject was given a new curriculum change and the structures of schools were changed as Hitler created elite boarding schools and abolished private school. The German youth were further controlled outside of the classroom, as participation in the Hitler Youth and The League of German Girls were mandatory.

Alex Kulvivat '22 and Jdody Misidor '21, Randolph College, *Designing an experiment to study the effects of heat stress on benthic microalgae*, Advisor: Sara Sojka

Benthic microalgae live in a dynamic environment of variable temperatures, light and water levels. Effectively studying these organisms in the lab requires mimicking these conditions but most approaches described in the literature either neglect key elements of the environment or are beyond the budgetary limits of projects at a small liberal arts college. We designed an apparatus to mimic tidal movement, light environment and temperature for a total cost of less than \$2000 and compared monitoring results from the apparatus to data from the Eastern Shore of Virginia. The apparatus produced an appropriate tidal range, light regime and sufficient water movement to prevent anoxia. We were also able to effectively reproduce heat stress events.

Julie Horton '20, Sweet Briar College, *A Study in black and white: racial discrimination in the U.S. armed forces during Vietnam*, Advisors: Lynn Laufenberg and Dwana Waugh

President Harry S. Truman signed Executive Order 9981 on July 26, 1948, theoretically ending discrimination in all United States military branches and creating the purest form of labor equality in the nation. However, institutional racism continued to weave its way through federal government policies, and discrimination of Black populations permeated both the domestic and forward-deployed military commands in the 1960s and 1970s. Ubiquitous racial tension and discrimination continued after Order 9981 as well as subsequent legislation, the Civil Rights Act, signed into law under President Lyndon B. Johnson in 1964. Major archival research, subject-specific books from acclaimed African American and Vietnam War historians, and information gathered from the Library of Congress' collection of Vietnam veterans' oral histories revealed that continued racism in the military mirrored racism and discrimination in American society. The evidence revealed that Jim Crow ideology continued its tight grip not only on American soil, but the battlefields in Vietnam.

Charles Abraham '20, James Madison University, *MOVE: Philadelphia's forgotten bombing*, Advisor: Raymond "Skip" Hyser

On May 13th, 1985, the city of Philadelphia erupted into flames. Under the orders of Mayor Wilson Goode, the Philadelphia Police Department dropped a bomb onto the rowhouse containing MOVE, a cult-like organization, on Osage Avenue in West Philadelphia causing a fire that killed eleven people, including five children, and burned down sixty-one other houses. Using newspaper articles on the bombing and the public's

response, this paper investigates how Mayor Goode was able to continue his political career and gain reelection as the Mayor of Philadelphia and how the bombing has faded into obscurity outside of the city. The lack of connection between the city and MOVE's quasi-Rastafarian beliefs as well as the city government's efforts to move past the MOVE bombing have caused this event to be forgotten. Sources: The Philadelphia Inquirer, 1985-1987; Robin Wagner-Pacifici, *Discourse and Destruction: The City of Philadelphia versus MOVE* (Chicago: University of Chicago Press, 1994); Hizkias Assefa, *Extremist Groups and Conflict Resolution: The MOVE Crisis in Philadelphia* (New York: Praeger, 1988).

Ashani Parker '21, University of Lynchburg, *Crossing the bridge between museum and community*, Advisor: Barbara Rothermel

This presentation overviews the Smithsonian's community research program and the importance of the museum's role in cultural preservation and revitalization. The Community Research Program works through several Smithsonian Institutions to aid in goals of cultural revitalization by increasing access to archives and collections. Many of the indigenous researchers who venture to the museum see the vast repository as the key to reviving or protecting their languages and material culture. While the primary objective of the program is to assist the individual goal of the communities, the relationship between museums and communities is symbiotic. By partnering with indigenous communities, the museum is also better equipped to address global issues such as the loss of tangible and intangible culture. The perception of the museum changes from one of a static and sterile environment to a dynamic and interactive space. The museum's duty is to adopt this role as an active cultural agent.

Session IX: 1:30 -2:45 p.m., Psychology 101

Henry Ford, James Madison University, *Exodust: movement of a peoples' quest for liberty*, Advisor: Stephen A. Reich

In 1880, a special committee of the U.S senate drafted a report on the great numbers of African Americans seeking a new home in the west. Following the civil war, great numbers African American freed men and women fled the cruel postwar oppression of the United States. Seeking succor in the west, these intrepid pioneers responded to the promises of greater freedom in the frontier states. Especially evident in the all-black town of Nicodemus, the exoduster movement was crucial in revealing the first formation of black identity in the United States. Rife with religious symbolism, the views of these settlers and the fruits of their labor revealed the means by which African American settlers created and understood their new distinct identity as free Americans. Such remarkable evidence can be found in the newspapers of their towns and the memoirs of those who sought and fought for their own national identity. The exoduster movement featured the vast migration of former African slaves to the western frontier. These former slaves were seeking opportunity and freedom from the continued violent oppression of Post-civil-war America. The religious symbolism of Pap Singleton as Moses and the founding of Nicodemus reveal an early example of African-American cultural identity. Reports and Newspapers of Nicodemus reveal the views of black settlers and the realities of their town. Such aspects demonstrate the creation and nature of the African-American community in U.S during the late 19th century and, in relation to their Eastern counterparts, we see how equitably capable and productive black settlers were in developing a new American identity.

Emily Wandling '20, Sweet Briar College, *Extraction of Betulin and synthesis of a Betulin analogue*, Co-authors: Casey Atkins and DaZane' Cole, Advisors: Abraham Yousef and Michael R. Davis, Jr.

Betulin is a natural product found in the bark of the paper birch tree (*Betula papyrifera*). It was isolated using Soxhlet extraction with chloroform in an average percent yield of 6.85%. To enhance betulin's antimicrobial properties, a novel betulin derivative was synthesized. A dehydration reaction with concentrated sulfuric acid was completed to afford dehydrated allobetulin. The structure of dehydrated allobetulin was confirmed using spectral analysis. Efforts are underway to determine if the derivative possesses inhibitory properties against *Pseudomonas aeruginosa*.

Mary Connell '21, James Madison University, *Help needed for the journey west: the corps of discovery expedition*, Advisor: Chris Arndt

It took the famous Lewis and Clark expedition over two years and 8,000 miles to make the round trip from St. Louis to the Pacific Ocean in search of a water trade route that would connect the newly purchased Louisiana Territory to the young country of the United States. Led by decorated captains, Meriwether Lewis and William Clark, the expedition would not have been possible were it not for the aid of French frontiersmen and the native tribes who called the northwest their home. The help received from these peoples were sometimes the difference between life and death for the team, yet have remained relatively unsung in today's history lessons. With the use of the journals from the journey, major events and interactions with non-party allies were recorded that I argue were critical to the success of the mission.

Taylor Dominique '21, James Madison University, *Those who resisted Hitler: the anti-Nazi resistance movement within Germany*

When discussing the resistance to Adolf Hitler in World War II, it is a common misconception that the vast majority of German citizens were compliant, if not supportive, of Hitler and the Nazi regime. Before he consolidated power within Germany, numerous groups and individuals resisted his rule and the ideology Hitler promoted. Civilian groups and individuals did their part to fight back against the Nazi establishment. It is not well known that various German political parties, religious groups, university students, as well as those of both genders, socioeconomic status, and ages resisted the Nazis. They risked their lives and knew well the consequences waiting for them if their efforts were discovered.

Despite the threat of certain death, they believed that it was more important to stand up for what was right. The efforts of these German citizens who resisted the Nazis has been severely understated since the end of WWII. Their determination to free Germany from the stranglehold of Hitler should be seen as an extraordinary demonstration of courage, and should not be forgotten.

Dylan Danelson '21, James Madison University, *James Madison and Patrick Henry: the battle over Virginia ratification of the constitution (1787-1788)*, Advisor: Dr. J. Chris Arndt

Perhaps the most critical point in American history, the Virginia Ratifying Convention of 1788, transformed the trajectory of how the United States would be governed for centuries to come. The convention was a battle of political savviness, oratorical power, and revolutionary thought led by two extraordinary patriots: James Madison on the Federalist side, and Patrick Henry leading the Antifederalists. Madison believed in the rights of the individual, but concluded that a stronger federal government was necessary to meet the needs of a growing nation. Henry feared that a stronger federal government would put too much power into the hands of the elite who would neglect the interests of the citizens. This paper uses journal articles, books, and speeches and writings from the convention to examine how James Madison's attempt to remodel American government combined with Patrick Henry's skepticism helped produce the United States Constitution as we know it today.

3:00- 4:00 p.m. Poster Presentations, Hampson Commons

Emma Coogan '20, Roanoke College, *Testing the limits of perception and cognition in the pavement ant *Tetramorium immigrans, Advisor: Rachel Collins**

Hymenopteran insects depend on a variety of environmental cues in order to navigate optimally while foraging and returning to the nest. Examinations of ants' visual navigational abilities have indicated that different species can actually distinguish between different colors of light and be trained to attend a specific color given previous instances of a food reward. In order to explore such a capacity in a local species, we collected pavement ants (*Tetramorium immigrans*) from the Roanoke College campus and took them through a training regime designed to have them associate the color blue with food. While no ants attended one color more than another after training, both colonies were more often present on the left-most apparatus within their testing chambers after experiencing the training regime. This species is seemingly not capable of being trained to associate a color cue with food, but this may, in fact, be because this species cannot differentiate between colors. Neither the need to differentiate between blues and yellows nor the need to associate such details with food may have arisen in its evolutionary history, especially given that this ant is adapted to life in an urban environment.

Kasey Cooper '23, Roanoke College, *Ethanol affects neural and mesodermal organ development in zebrafish (*Danio rerio*)*, Co-author: Jocelyn L. Bocianowski, Co-author and Faculty Advisor: Christopher S. Lassiter

Fetal Alcohol Spectrum Disorders (FASD) affect 1 in 100 births and occur when a fetus is exposed to alcohol. FASD can cause severe developmental issues such as heart defects, facial deformities, and behavioral issues. Although prevalent, studies have not started to explore the specific effects of ethanol on early development until recently. Due to their transparency as embryos, and similarities to early development in humans, *Danio rerio* (zebrafish) were used in this study to examine the effects of ethanol on development. This study showed that ethanol decreased the body length, eye diameter, eye area, somite distance, and intersegmental blood vessel distance, while increasing the heart rate and edema presence in treated embryos.

Johanna Enzmann, James Madison University, *Respirable Crystalline Silica (RCS) in a university concrete research lab*, Co-authors and Advisors: Heather A. Kirkvold and Daniel I. Castaneda

Crystalline silica is a naturally occurring compound found in common construction materials like Portland cement. Since the early 20th century, respirable crystalline silica (RCS) (particles sized below 5 microns) has been recognized as a significant hazard in construction related workspaces, particularly for its high relation to occupational diseases such as silicosis. The Occupational Safety and Health Administration (OSHA) redefined limits to RCS in 2016 to help reduce rates of silicosis. The breadth of their action affects many industrial settings, including small-scale university concrete research laboratories. There is very little, known information about RCS levels within a university concrete research lab, so the intent of this study was to instrument personnel and sample their individual level of exposure during typical concrete laboratory activities (including cement bag handling, concrete mixing, concrete strength testing, and discarding of waste materials). The intent of this study is not to improve the methods of measuring RCS and dust; but rather to highlight the extent to which RCS is a risk within an enclosed concrete lab space and identifying best practices to mitigate exposure risks.

Keyu Jin '20 and Priscilla Ranjitkar '20, Randolph College, *Inventory and assessment of old-growth forests to support the 500-Year Forest Foundation*, Co-author and Advisor: Karin Warren

To assist the 500-Year Forest Foundation in the goals of old growth preservation, we developed a simple, replicable, and cost effective protocol and conducted baseline forest inventories at several 500YFF forests in Virginia. Each inventory included tree density, species (native and

non-native), diameter at breast height, average stand age, undergrowth coverage, and observation/assessment of human disturbance. We also explore options to incorporate future forest inventories as part of the Randolph Environmental Studies & Science curriculum, in an ongoing partnership with 500YFF.

Genevieve Lewis '20, Christopher Newport University, *Does attention control account for the link between psychological inflexibility and internal distress?* Co-authors: Lindsey Stone, Christopher Newport University, Lauren Bylsma, University of Pittsburgh Medical School

Psychological inflexibility (defined as experiential avoidance and cognitive fusion) has been connected to many forms of internal distress. Attention control, the ability to shift and focus one's attention, may account for this association. We tested if youths' attention control would mediate the link between psychological inflexibility and internal distress. Participants were 88 youths (ages 8-13) recruited according to parental history of depression. Participants completed questionnaires on psychological inflexibility, attention control, depressive symptoms, and anxiety symptoms. Analyses revealed attention control fully mediates the relationship between psychological inflexibility and depressive symptoms, and partially mediates the relationship between psychological inflexibility and anxiety symptoms. Both models held when co-varying for gender, age, and depression risk. Psychological inflexibility is linked with symptoms of youth depression and anxiety and this association is at least partially driven by lower attention control. Longitudinal research is needed to determine the direction of effects between these variables.

Stephen Mitchell, '22, James Madison University, *Assessing athletic performance with a wearable inertial measurement unit*, Advisor: Jason Forsyth

The drop jump ratio is a metric used to measure fatigue by finding how quickly and forcefully a person can reverse their momentum after dropping off a raised platform. Most commonly used for competitive athletics, the drop jump ratio is useful for tracking performance over time. The current method for measuring the drop jump ratio requires a force plate to measure when a participant touches and leaves the ground. Force plates are expensive devices, which therefore restrict the drop jump ratio metric to those that can afford the tools to measure it. The PlayerTrak project explores how wearable computing could be used to provide a larger population access to drop jump ratio data by examining the feasibility of using commercially available accelerometers to measure the metric. This research will show initial results comparing drop jump ratios measured with a worn accelerometer and a force plate in a biomechanics lab.

Elizabeth Tafoya '20, James Madison University, *Life Cycle Analysis (LCA) of bio-fiber reinforced concrete*, Co-authors: Heather Kirkvold and Daniel Castaneda

Concrete is made up of coarse aggregate, fine aggregate, water, Portland cement, and additives. To increase the toughness and long-term durability of concrete, polypropylene fibers are added to limit the propagation and growth of cracks. Polypropylene is a synthetic textile fiber that is energetically expensive to produce. In this study, bio-fibers (generated as a waste product of industrial hemp production) are utilized in lieu of synthetic fibers. The stalks are dried, peeled, and cut to fiber-like size to be incorporated into fresh concrete mixtures. Mechanical testing has been conducted to evaluate the performance between bio-fiber and the conventional synthetic-fiber reinforced concrete. The work showcased is a Life Cycle Assessment (LCA), created with SimaPro, comparing various parameters between bio-fiber and synthetic-fiber reinforced concrete to understand whether there is a favorable or unfavorable impact to the environment. The testing matrix includes concrete dosed with fibers at 0%, 1%, 5%, and 10% by volume.

Hannah Brown '20, Christopher Newport University, *A diary study examining the fading affect bias across social media and non-social media events*, Co-authors: Clare Dayton, Gena Delano, Emma Friedmann, Elizabeth Mazello, Emily Peterson, and Jeffrey Gibbons

Unpleasant affect fades faster than pleasant affect, and this phenomenon is referred to as the Fading Affect Bias (FAB) (Walker, Skowronski, & Thompson, 2003). The FAB is smaller for social media events than for non-social media events, and that the FAB negatively predicts anxiety for non-social media events (REF). The current study extended the social media and FAB study using a diary procedure. Participants reported and rated the pleasantness of pleasant and unpleasant social media and non-social media events for one week, and then they recalled the events and rated their affect one day after the final reporting day. The FAB was larger for non-social media events than for social media events, the number of foils recognized were negatively related to the FAB, and rehearsal ratings were positively related to the FAB. Importantly, the number of foils recognized mediated the relation of FAB to rehearsal.

Lauren Chadwick '22, Christopher Newport University, *Negative effects of modern social media on anxiety and depression: a literature review*, Advisor: Sherman Lee

Social media has developed over the past 15 to 20 years. Psychologists are studying its effects on mental well-being, specifically anxiety and depression (Volungis, Kalpidou, Popores, & Joyce, 2019). This literature review looks at 5 articles and the correlations of social media use on cell phone apps with anxiety and depression, and also differences in depression and anxiety prevalence rates in current youth between 13-17 years old, compared to the youth of 20 years ago. It was found that antisocial behavior, diagnosed depression and anxiety, extraversion, and maladaptive sleep all have a strong correlation to social media use and diagnosed depression and anxiety has increased during the past 20 year period.

(Augner, & Hacker, 2012) & (Ghandour, et al., 2018). Further study should look at understanding societal forces being critical to the evolution of treatments and standardization of the diseases in a new digital time.

Alexander Conway '20, Randolph College, *Behavioral coding of children's engagement in a group musical setting*, Co-author: Jessica Lawson, Vanderbilt University, Co-author and Advisor: Sara L. Beck

Little is known about how typically developing children's engagement differs across various musical activities or repeated exposure to the same musical stimulus. The current study investigated pre-kindergarteners' musical engagement operationalized as gaze orientation, gesture participation, and vocalization across three word-learning activities. The conditions were nonmusical, rhythm & spoken word, and rhythm & sung melody. Behaviorally coding from video, we assessed four classrooms participating in all three conditions. Preliminary analyses indicate that gaze orientation increased in both musical conditions over time, while vocalization increased only in rhythm & spoken word. This demonstrates that utilizing rhythm & sung melody to facilitate instruction may not benefit children's engagement beyond rhythm & spoken word, which should encourage educators who seek to incorporate musical instruction, but lack singing experience. Additionally, the increase in engagement over time for the rhythm & spoken word condition suggests that rhythm-only musical instruction actually may promote children's engagement over time.

Taylor Craft, '20, Randolph College, *Gender discrepancies in sport and performance psychology career placement after graduate school*, Advisor: Meghan Halbrook

Interest in the current research project starts with the realization that many graduate programs, especially psychology-related disciplines, have more female students than male. The exception is classic STEM programs (Applerouth, 2017; Landers, 2015). The reasons for this have been highly researched and results yield consistent concerns associated with early socialized perceptions that females underestimate their abilities in math (OECD, 2013) and science, leading to the conclusion that STEM disciplines are "male" domains. This belief often influences females' academic and occupational interests. The same is true of sport, which is often perceived to be hyper-masculine, promoting aggression and physical prowess. The dichotomy of sport and psychology coming together in Sport and Performance Psychology (SEPP) and the impact on graduate school enrollment and career placement has not been heavily explored (Roper, 2008). This research examined the current demographics, as well as graduate school and occupational experiences of SEPP graduate students, faculty, and consultants.

Kyle Darmstead '20, Christopher Newport University, *Dress to impress: impression management of professional dress codes in the workplace*, Advisor: Thomas D. Berry

This paper examines the rationale and debates the social construct of "professional dress code." Professional attire is expected in all kinds of jobs, from hospitals, sales, mid-executives to top executives. My analysis focuses solely on office jobs, where organizations typically have a conservative attire norm across genders. Such workplace norms are associated with traditional Monday through Friday, 9-5 office jobs that millions of "white-collar" Americans experience and endure. My paper ultimately asks the question: why are having such dress codes necessary for the workplace? If the work itself is unaffected by fashion, and there is no applicable need for employees to wear specific clothes in order to complete their jobs, then why have it? Is there any science to back up this generational norm to "look good" to "feel good" approach? Such questions seem paradoxical when society teaches us to judge using performance criteria rather than simply by one's appearance.

Lauren Davis '20, Christopher Newport University, *Importance of fostering growth mindset and resilience: a literature review*

Mindset can set the path and framework for a child's academics, decisions, and career paths. A fixed mindset, one in which a person believes their ability is fixed and failures define them, can not only impact motivation and educational performance but also lead to increased rates of anxiety, depression, and suicidal ideation. In contrast, children who are taught early in life that their ability and other personal attributes are instead malleable and can be developed, show more positive responses to failures, greater well-being, increased student involvement, and higher rates of resilience. Thus educators should foster growth mindset in children by instilling resiliency, perseverance, and patience when navigating educational challenges. Growth mindset, once developed, then continues to impact decision making and career paths throughout the lifespan resulting in more capable young adults who are better able to handle life's stressors of emerging adulthood.

Lindsey Evans '20, Parker Moore '22, and Zemariah Sanders '22, Mary Baldwin University, *The effect of levonorgestrel on breast cancer progression*, Co-Author and Advisor: Melissa N. Scheiber

In the United States, approximately 1 out of 8 women will develop invasive breast cancer over the course of her lifetime. Many of these invasive breast cancers express the estrogen and/or progesterone hormone receptors. Although numerous studies have described the carcinogenic role of estrogen in breast cancer, the role of progesterone has yet to be elucidated. We hypothesized that levonorgestrel, a synthetic progesterone found in birth control, would promote breast cancer progression. To test this hypothesis, progesterone receptor positive T47D breast cancer cells were treated with 0.1 nM levonorgestrel for 72 hours. Cellular viability assays demonstrated a significant increase in proliferation and no change in cellular death. Real-Time RT-PCR revealed significant changes in epithelial-to-mesenchymal-associated genes, E-cadherin and TWIST. Western blot analysis also demonstrated a decrease in E-cadherin protein. Future studies will continue to investigate the effects of levonorgestrel on

breast cancer progression, using both an in-vitro and in-vivo model.

Emma Friedmann '22, Christopher Newport University, *Fading affect bias in relation to marijuana and non-marijuana events*, Co-authors: Hannah Brown, Jodi Cleaver, Andrea Corbett, Luke Fernandez, Angelica Florendo, Stephanie LeRoy, Liz Mazzello, Chessie Pandolfe, and Emily Peterson, Advisor: Jeff Gibbons

The fading affect bias (FAB; Walker, Skowronski, & Thompson, 2003) occurs when unpleasant emotions fade faster than pleasant emotions (Walker, Vogl, & Thompson, 1997). The FAB appears to be a healthy coping mechanism (e.g., Walker, Skowronski, & Thompson, 2003b) that is positively related to healthy outcomes (Gibbons et al., 2017). However, some researchers have shown that the FAB can be related to maladaptive behaviors, under certain conditions. For example, frequent consumers of alcohol show a larger FAB for alcohol events, which is clearly maladaptive (Gibbons et al., 2013). Similar findings have been demonstrated across various other event types and measures related to those event types. However, past research has not examined the FAB across marijuana events until the current study. We expected, and found using 3 different measures of marijuana consumption, that the FAB would be large for non-marijuana consumers rating non-marijuana events and marijuana consumers rating marijuana events.

Karyn Heisig '20, Randolph College, *"Looking for normal:" An investigation and dissection of stagecraft within liberal arts colleges*, Co-author and Advisor: Heather Sinclair

Using the play "Looking for Normal" by Jane Anderson, I constructed my own unrealized design by implementing learned skills in selected areas of set design. I compiled a series of testimony and artistic styles showcased in a concise pamphlet that will be distributed to future stagecraft students and teachers as reference material for constructing their own artistic vision.

Brandi Houck '21, Christopher Newport University, *Risky sexual behavior: does being a committed relationship make a difference?* Advisors: Shelia P. Greenlee and Dorothy C. Doolittle

Sixty-three college-aged females were recruited through the psychological SONA system to complete a three-part questionnaire on feelings toward sexual behavior. The Sexual Behavior Survey contains demographic data, a 14 item Likert rating scale on sexual beliefs and habits, and a 10 item scale assessing attitude change since coming to college. Results indicate that females in committed relationships hold differing views on sexual behavior than those not in committed relationships. More females in relationships said "unprotected sex in an uncommitted relationship is okay" than those not in a relationship. Those in a committed relationship reported a positive change in feelings towards multiple sex partners since coming to college ($m = 0.17$), whereas those not in a committed relationship reported a negative change in feelings ($m = -0.6$). An ANOVA indicates that there is a difference in beliefs regarding casual sex between those in a relationship and those not ($p = 0.554$).

Mary Jobe '20, Christopher Newport University, *Effects of social isolation on the elderly: a literature review*, Advisor: Sherman A. Lee

Social isolation is an issue that affects people of all ages. Since humans are social creatures, being socially isolated can have negative impacts, such as depression and suicidal ideation (Leary & Baumeister, 2002; Bell, 1989; DeMartini, 2014). One particular group of people that are more prone to social isolation are the elderly. This is because, as people age, they tend to live alone, lose their physical and mental functioning, and have a depleting social network (Alexander, 1999). This literature review will examine the factors that lead to social isolation within the aged population, since they are at greater risk. Currently, with a large portion of our aging population being of the Baby Boomer generation, social isolation among the elderly is pertinent. Further research should study and understand the extent and effects social isolation has on this growing age group.

Rebekah Jones '20, James Madison University, *Effect of vestibular stimulation on verbal and nonverbal communication in children with autism spectrum disorder*, Co-author: Marsha Longerbeam, Advisor: GERALYN TIMLER

The Center for Disease Control (CDC) reports that autism spectrum disorder (ASD) is present in 1 in 59 children in the United States. Within this population, sensory processing difficulties are present in essentially all individuals. The fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) defines hyper and hyposensitivity to sensory input within the criterion of restrictive and repetitive behaviors. One method of therapy for children with sensory input dysfunctions is sensory integration (SI) therapy, which introduces sensory input to individuals in order to modify their response behaviors. This pilot study is examining the effects of sensory input, specifically vestibular stimulation, on nonverbal and verbal communication output in children with ASD. Vestibular stimulation is defined as an introduction of movement, which was swinging in the form of linear, vertical, horizontal, rotary, or orbital. Using observational methods and research-supported procedures, the participant's verbal and nonverbal behaviors were recorded and coded.

Leif Kvarnes '20, Randolph College, *Tribology of an antimicrobial surface*, Advisor: Peter Sheldon

Antimicrobial surfaces are being deployed in doctors' offices, airports, bathrooms, and other busy public spaces. We are working to create a means of measuring the effectiveness of these surfaces over time. The effectiveness of these surfaces over time is not well understood, and we

are trying to develop a systematic method of creating lab-stressed samples.

Cat Stricklin '20, Hollins University, *Synthesis and characterization of Dirhenium compounds containing Ligands analogous to Bis(diphenylphosphino) methane*, Advisor: Daniel R. Derringer

Characterization of $\text{cis-Re}_2(\text{O}_2\text{C}_2\text{CH}_5)_2\text{Cl}_2(\text{dppm})_2$ by ^1H -NMR spectroscopy led to the observation of an unusual chemical shift for one of the bridgehead methylene protons of dppm ($\text{Ph}_2\text{PCH}_2\text{PPh}_2$). In order to clarify which hydrogen of dppm is associated with this chemical shift, attempts were made to synthesize compounds with comparable diphosphine ligands, namely, $\text{Ph}_2\text{PCH}(\text{CH}_3)\text{PPh}_2$ (dppmMe) and $\text{Ph}_2\text{PCH}(\text{CN})\text{PPh}_2$ (dppmCN). Characterizations of new compounds will be presented, including the structural characterization of $\text{Re}_2(\text{O}_2\text{CCH}_3)_2\text{Cl}_2(\text{dppmMe})$ ($\text{Ph}_2\text{PCH}(\text{CH}_3)\text{PPh}(\text{C}_6\text{H}_4)$).

Zachary Swanson, Christopher Newport University, *The universal utility of morals: a social-evolutionary approach to religious virtues*, Advisor: Thomas Berry

The purpose of this study is to examine the relationship between virtues of different religions and the cultures they are practiced in. A special emphasis is placed on the moral virtues that are present in each religious landscape. A conceptual model is developed that contains the following hypotheses: (a) there are some virtues that persist in most religious traditions, (b) the virtues that are present universally serve some evolutionary role in survival, (c) virtues that are not universally present are products of specific cultures rather than human evolution, and (d) of these cultural virtues, there is an overlap based on the religious landscape they were founded in. Data was gathered from each major religion concerning their central virtues and was analyzed to observe trends in religious virtues.

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Qian Zhao Dec '19, James Madison University, *Running a distributed ledger: An overview of the implementation of blockchain*, Co-author: Jinxia Chen, Advisor: Chengqi (John) Guo

Many business leaders and technology gurus see Blockchain as the “major” and “transformational” IT phenomenon. Some of the well-established projects that cost millions of dollars or more deliver value without actually using a blockchain. The hype is phenomenal. Nevertheless, it is still unclear, for many people including the next generation of information workers, how a Blockchain works, let alone building one. Therefore, this project intends to shed light on these issues by showcasing the technical artifacts behind the scene. It also reveals some use cases where Blockchain is not merely a buzz word in the title, but a key asset to organizations.

Special Thanks

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