



BASIS PHOENIX
SENIOR PROJECTS 2021–2022



SENIOR PROJECTS & SENIOR RESEARCH PROJECTS

At this point in their senior year, BASIS Charter School students have completed a set of four BASIS Capstone classes to earn their BASIS Diploma with Honors. In addition, many students are in the process of completing the prestigious College Board's AP Capstone Diploma™, a challenging, two-year sequence of AP Seminar™ and AP Research™, plus four other AP® Exams, all of which require extensive research, writing, and oral defense. The BASIS Diploma Senior Project marks the culmination of this hard work and perseverance.

Completed in the third trimester of their senior year, the Senior Project is unique, self-designed, and reflective of the students' varied academic interests and passions. Regardless of the discipline —business, art, humanities, science, engineering, social work, medicine, or law — each senior must develop and explore a research question. Creating an abstract that sets the tone of the research, participating seniors must submit a project proposal, and later, orally defend their methodologies.

Under the guidance of an external advisor who is a professional in their field, as well as a faculty advisor from their school, students dedicate 10–15 hours per week to the completion of their Senior Project. To document their journey, students post weekly blog entries about their experiences, successes, and challenges as they explore their guiding question. This journaling provides a unique viewpoint on the student activities and adds a reflective layer to their research process.

Throughout the development of the Senior Project, BASIS Charter Schools support their seniors every step of the way as they develop investigative skills and their own individual scholarly pursuits. The abstracts in this publication clearly illustrate each senior's ability to apply the knowledge, and intellectual curiosity they have acquired in the classroom to professional research methods and learning. At the successful conclusion of this project, students are eligible for a BASIS Diploma with High Honors, the most distinguished accolade offered by BASIS Charter Schools.

Each member of the BASIS Charter Schools network commends our seniors for their dedication, and motivation, not only for completing this Senior Project, but for their commitment to the BASIS Charter School Curriculum. Congratulations to them on this powerful achievement, and our best wishes as they move forward on their educational journey.



Carolyn McGarvey
Chief Executive Officer
BASIS.ed AZ+



Peter Bezanson
Chief Executive Officer
BASIS.ed Texas

The background is a solid orange color with a complex, light-colored geometric pattern. This pattern consists of a grid of lines forming a series of nested squares and rectangles, with various circles and arcs overlaid. Mathematical symbols for the golden ratio, including the Greek letter Φ and the fraction $1/2$, are scattered throughout the design, often placed near specific lines or points in the geometric construction.

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Phoenix SENIOR PROJECTS

ARSHIYA A.



NOW YOU HERE ME, NOW YOU DON'T: EXAMINING THE EFFECT OF AUDITORY DISTRACTION ON READING COMPREHENSION IN INDIVIDUALS WITH MILD TRAUMATIC BRAIN INJURIES

ABSTRACT: Over 50% of mild traumatic brain injuries go undiagnosed in healthcare (Voss et al., 2015), so it is important to understand the injuries in a day-to-day life context in order to further comprehend their effects. Mild traumatic brain injuries (mTBIs) may impair or impact various areas of executive functioning and processing including working memory, decision making, and cognitive-linguistic processes. Reading comprehension employs a multitude of cognitive skills that are typically impacted from these injuries. When tasks are paired with external factors, such as auditory distraction, an individual's concentration and accuracy are often affected, especially in individuals with mTBIs. The goal of my project is to examine the effects of mTBIs on functional tasks, specifically reading comprehension, while exposed to auditory distraction. I will be working with Dr. Ratiu to analyze participants' eye movements in order to understand the relationship between auditory distraction and reading comprehension in individuals with mTBIs and if there are any other underlying factors that may affect the results. The study uses two eye-movement tracking technologies to collect sensitive cognitive data in individuals with and without an mTBI as they read paragraphs and answer corresponding questions, with and without, distraction. The investigation is an approach to understanding how mTBIs affect daily activities. The study is especially relevant as participants in this are college students and reading with background noise is a common occurrence in academic and professional life. These results could be important in creating future strategies to aid individuals with mTBIs in improving their reading comprehension.

• **BASIS ADVISOR:** Brittany Holtzman • **ON-SITE MENTOR:** Ileana Ratiu

MANASI A.



FROM DIAGNOSIS TO PREVENTION: CAN WE DETECT DEMENTIA EARLY ON?

ABSTRACT: It is a common consensus that individuals with dementia cannot live a happy and thriving life. Dementia is a general term for the memory loss and problems with other cognitive abilities that can be severe enough to interfere with one's daily performance. As people age, the risk of developing dementia significantly increases, making it more common later on in one's life. This disorder is typically diagnosed after the age of 65 when symptoms are already prominent and hard to reverse. At this point, victims of dementia are left to deal with the symptoms as they progress to more severe extremes. This Senior Research Project aims to determine the effectiveness of the existing methods used to diagnose dementia, such as the Mini-Mental State Examination, a set of 30 questions used to test for any cognitive impairment. This screening test is used to indicate signs of dementia, rather than make a complete diagnosis. Through a combination of patient responses and their medical history, the data collected is aimed at diagnosing dementia before the symptoms become irreversible. This research will be taking place at the Neurology Center of Arizona under the guidance of Dr. Shyamala Kumar, who is the expert neurologist there. This project will also be directed towards assessing potential causes of dementia, such as being predisposed with problems including high blood pressure, high cholesterol levels, stroke, head trauma, family history of Alzheimer's Disease, etc. The goal of this project is to detect dementia before the symptoms are visible and make patients aware of the preventative measures they can take on their own to live a normal life and limit the development of the disease early on.

• **BASIS ADVISOR:** Brittany Holtzman • **ON-SITE MENTOR:** Dr. Shyamala Kumar
• **LOCATION:** Neurology Center of Arizona

LEXIE B.

THE DOT PRODUCT, HYPERBOLIC GEOMETRY, AND EUCLID'S 5TH AXIOM



ABSTRACT: The geometry that is taught in secondary education is guided by Euclid's 5 axioms. However, as Euclid's axioms are adapted beyond the linear plane, the rules and functions of geometry change. Examples of these new types of non-Euclidean geometry include hyperbolic geometry and spherical geometry. The different types of geometry model our land, our oceans, our planet, and our universe. Having such different types of geometry has made mathematicians question what really defines geometry. My project addresses the parameters that define geometry and how these parameters can be assessed through functions, such as the dot product. The dot product is an operation that takes two vectors as input and returns a scalar number as output. This allows one to input two-dimensional data and assess it as one dimension. Throughout my project, I research this function and how it can further shape and define Euclidean and non-Euclidean geometry.

• **BASIS ADVISOR:** Dylan Crane • **ON-SITE MENTOR:** Dr. Dave Poletta • **LOCATION:** Arizona State University

FRANCIS C.

SONIC SEASONING: THE INCORPORATION OF SOUND INTO MODERN TASTING MENUS



ABSTRACT: Eating at fine dining restaurants is an experience of all the senses. As the food is set on the table, you start with your eyes—forming your idea of what the dish could taste like. Soon after, the vapors seep into your nostrils, and your taste buds begin to anticipate the flavors. Lastly, you pick up your utensils and feast. Restaurants employ many techniques to excite the senses. Flavored smokes and mists can be used to prime the palate. Dishes can be constructed to look like other foods to trick the mind. However, one sense is often overlooked in designing these dishes: hearing. Studies by Oxford professor Charles Spence have shown that 27% of drinks passengers order on airplanes have tomato juice; the cabin noise amplifies the perception of umami, improving the drinks' flavor. Other studies have even shown that high frequencies can enhance sweet flavors, and lower pitches can enhance bitter flavors. My project seeks to study the effect of sound on taste, to be incorporated in tasting menus to manipulate the perception of specific flavors. At Sel Restaurant, I will experiment on chefs and kitchen staff, feeding them one-bite dishes with and without sound, and surveying them on the strength of sweetness, sourness, bitterness, saltiness, and umami of each. The experiment will test the effects of different intensities, volumes, and genres of music. Along with my research of Sel's menu-creating process, the experiment will provide more insight for chefs to take their restaurants to the next level.

• **BASIS ADVISOR:** James Kittredge • **ON-SITE MENTOR:** Chef Branden Lavine, Owner/Executive Chef of Sel 2.
• **LOCATION:** Sel Restaurant, Old Town Scottsdale

YORICK H.

A STATISTICAL APPROACH TO PENALTIES IN SOCCER



ABSTRACT: In soccer, penalty kicks are isolated one-on-one situations between a striker and a goalkeeper, in which the ball is placed 11 yards away from the goal, and a striker attempts to score. In a sport where games are often decided by just one goal, the conversion of a penalty is crucial to the final outcome. The conversion rate, whether or not a penalty kick in soccer is scored, appears to be random, as roughly 75% of penalty kicks in professional men's soccer are converted. Even some of the best strikers in the world, such as Cristiano Ronaldo and Lionel Messi, have a shot-conversion of roughly 80% throughout their career. In my independent research, I will attempt to answer three questions: How much is the end result of a penalty (goal or no goal) determined by chance? Is there an optimal way that coaches should organize the line-up for a penalty shootout? And is there a specific strategy that can help penalty takers score more often? I use various Microsoft Excel tools to analyze data from penalties across multiple professional soccer leagues in order to hopefully create a model that both predicts the outcome of penalties and suggests what tactical changes coaches as well as strikers can implement to improve the odds of scoring.

• **BASIS ADVISOR:** Teva Clark

ERIC H.

PAVING THE WAY



ABSTRACT: When we think about construction projects, the first things that come to mind are: how much extra time do I have to take, and why is it taking so long? Besides making a person wake up early, the time delays on projects are to ensure that the design choices fit each circumstance. The goal of my project is to grasp the daily routine of a multi-discipline transportation firm, so that we can address the inconvenience the road closures that can plague an interstate for years on end. My studies will lead me to work with the following disciplines of the process: roadway, traffic, drainage, structure and bridges, and construction management. In addition, my research will introduce me to traffic studies so I may understand how civil engineers design the geometry of roadways. Observing the team during their project will inform me of how these engineers determined which bridge design would be more suitable for a section of an interstate.

• **BASIS ADVISOR:** Kelsey Cooper • **ON-SITE MENTOR:** Chris Milner • **LOCATION:** T Y Lin International

SHYAM P.

COMPARING THE RELEVANCY OF STATISTICS IN THE NATIONAL BASKETBALL ASSOCIATION ACROSS ERAS



ABSTRACT: A large part of being a fan of sports is debate. Especially in the National Basketball Association (NBA), certain debates over which player is better are very common. I am one of these people that loves to engage in sports debates. A reoccurring point when debating whether a current player is better than a past player is that the player would have dominated if they had played in the past player's era because of the unique trends of the era. For example, in the 1960s and 1970s, three-pointers were much less common. At the time, the league was run by seven-foot players such as Kareem Abdul-Jabbar. Due to this, the majority of scoring was done right next to the basket. On the other hand, the modern era is very centered on the three-point shot. As a result, players like Stephen Curry thrive because of their ability to shoot the ball. I am trying to either validate or invalidate this argument. I will collect data from categories such as points, rebounds, and assists and manipulate it in a way to account for the change in era.

• **BASIS ADVISOR:** Johnson Truong • **ON-SITE MENTOR:** Dr. Tim Kay

SARAH P.

STUDYING, EXPLORING, AND APPLYING THE HISTORY OF ANIMATION AND ILLUSTRATION TECHNIQUES



ABSTRACT: For years, animation studios across the world have used their works to inspire artists to create their own animations. From Disney to Studio Ghibli, these studios' impacts on the art world and animation are undeniable, and their animators are renowned for their talent. However, as hard as many artists try to learn how to animate, it is very common for them to find it difficult to learn. Oftentimes, the techniques of well-known studios are kept under lock-and-key or require professional level equipment which are inaccessible to those not in the industry. As a result, a lot of artists who try their hand at animation are unable to go very far with it. I have wanted to learn how to animate for as long as I have been making art, but I never had any luck. I wish to try again to learn how to animate, pushing my own artistic abilities while encouraging others to do the same by creating a short final animation. My external experience requires me to create tutorials to explain how to do certain things on computers, tasks that are difficult for many people to complete. I am using what I learn to create a tutorial for how to animate in Procreate and Photoshop, in addition to analyzing the techniques of Disney and Studio Ghibli, incorporating them into my own animation style. This research will prove to be useful for those learning to animate, inspiring more artists to learn animation and tell their stories.

• **BASIS ADVISOR:** Luke Morris

VINESH P.

A STUDY INTO THE USE OF PROPAGANDA IN TOTALITARIAN STATES



ABSTRACT: Currently, there is a perception that totalitarian regimes have little regard for culture and simply rely on violent force to ensure their control. However, this assumption leads to the devaluation of Totalitarian Art as a non-legitimate form of artistic expression. Thus, art made under totalitarian regimes is underrepresented in the collections of Western art museums, including those of the former Eastern Bloc countries. However, as Igor Golomstock noted, "The truth is opposite: no where [sic] has the state valued culture so highly and devoted such constant attention to it." Without the regular elections and civil liberties of liberal states, totalitarian regimes do not have the ability to justify their power through the willing consent of the governed. Thus, such regimes rely on subliminal messages through art and culture in order to reinforce the status quo. For them, art and its message are vital to maintaining unity and order in their societies. Rather than simply observing propaganda as a tool of the state, I hope to investigate the substance of the art itself and its effects. These are the questions I hope to answer: What kind of art do totalitarian regimes produce? How do these regimes use their art and propaganda? How effective is this art at its intended purpose? Rather than simply document this totalitarian artwork, I will aim to examine a wide range of materials (posters, architecture, monuments, sculptures, etc.). My final presentation will demonstrate how totalitarian regimes legitimate themselves and the methods they employ.

• **BASIS ADVISOR:** Logan Hamilton

NATALIE R.

THE WAY WE WALK: A SEQUENTIAL CASE STUDY OF FOOT ANGLE



ABSTRACT: Around 84% of people complain of back pain at some point in their lifetime, and knee pain accounts for one third of musculoskeletal issues in doctors' offices nationwide. While many doctors scramble to prescribe pain medications and develop treatment plans to ease the numerous musculoskeletal complaints of their patients, many fail to consider the way people stand as a contributing factor to musculoskeletal issues. Peoples' natural stance impacts their entire musculature, as it can give insights into past injuries and predict weaknesses in major muscle groups, such as the quadriceps and hamstrings. At the Arizona Institute of Motion with Orthopedic surgeon Dr. Cory, I'm researching the way people stand with one deceptively complex measurement: foot angle, the angle between the middle of the body and the second toe on each foot. With a ten-question survey and images of patients' natural foot stance, I am determining if there is a relationship between foot angle and age, height, weight, sex, shoe size, orthotic use, activity level, sports history, and lower extremity injury history. My goal in this study is to identify if there is a correlation between any of the biometric data I collect in the surveys and the foot angles I measure. If a relationship exists between the biometric data and foot angle, then I hope my study can reinforce the importance of foot angle as an informative biometric so that physicians can consider it in the diagnosis and treatment plan of patients with musculoskeletal issues.

• **BASIS ADVISOR:** Amy Anderson • **ON-SITE MENTOR:** Dr. John Cory • **LOCATION:** Arizona Institute of Motion

NORBU S.

THE DETRIMENTAL EFFECTS OF THE COVID-19 PANDEMIC ON RADIOTHERAPY DELIVERY FOR CANCER PATIENTS



ABSTRACT: The COVID-19 Pandemic, spanning two years and millions of deaths, has had a catastrophic effect on nearly every facet of human activity. Hospitals and clinics have been overwhelmed by patients with respiratory illness, and restrictions and healthcare precautions have pushed back surgeries, radiation therapies, and chemotherapy regimens by months. Cancer care, which is critical to patient survival, often fell to the wayside in light of expanding burdens of COVID-19 patients, and infection risks to hospital staff. This project explores the potential increased morbidity and mortality of cancer patients resulting from pandemic-related delays. Since no comprehensive evaluation of the mortality and increased patient costs due to pandemic delays exists, my project will fill this niche and hopefully create a report that future researchers can refer to. I have had prior experience shadowing a radiation oncologist before the pandemic, and I understand how important it is to patient prognosis for treatments to be punctually administered. I will be conducting research in conjunction with Mayo Clinic radiation oncologists, analyzing research papers published in various Radiation Oncology journals over the past two years to uncover the varied rates of mortality and levels of advanced disease that can be tied to the rampant postponements and cancellations of critical treatments.

• **BASIS ADVISOR:** Amy Anderson • **ON-SITE MENTOR:** Dr. Terence Sio • **LOCATION:** Mayo Clinic

YASH S.

A COMPARATIVE STUDY OF WET AND SOLID PATHOGENS THIN FILMS PROCESSING AS A FUNCTION OF SPATIAL AND TEMPORAL POWER DENSITY IN 254 NM FLUORESCENCE AND 260-280 LEDS UV-C STERILIZATION SOURCES



ABSTRACT: Due to the recent rise of the severe acute respiratory syndrome Coronavirus 2 (SARS-CoV-2) and the looming threat of subsequent pandemics, the need for stable, safe irradiation of viral and bacterial loads is at an all-time high, both for recreational and professional use. Ultraviolet C (UVC) sterilization, optimally ranging from 254 nm to 265 nm, is ideal for biological agent detection and irradiation in an efficient manner that is the least volatile out of other possible forms of sterilization, as compared to Ultraviolet A (UVA) (1,000 times more effective), Ultraviolet B (UVB) (100 times), and Mercury Lamps, and does not emit ozone into the atmosphere. UVC photons in the range 254 nm to 265 nm, are optimal for irradiation as UVC photons have the ability to change the helix structure of DNA and RNA of bacteria and viruses affected both in the air and water, leading to a kill rate of pathogens being 99.99%. Different sources of UVC vary in stability through their average power density, measured in $\mu\text{W}/\text{cm}^2$. We expect the UV-C LEDs to be more effective than UV-C Fluorescence lamps. Through the physics labs of Arizona State University with lab professor Nicole Herbots, we are testing the reliability of these UVC Sources. These must be considered during the process of sterilization to allow for the most efficient and effective irradiation of surface pathogens.

• **BASIS ADVISOR:** Amy Anderson • **ON-SITE MENTOR:** Dr. Nicole Herbots
• **LOCATION:** Arizona State University Physics Department

NANAKO S.

THE BEAUTY OF JAPANESE GARDENS: HOW THE CREATION OF THE PHOENIX JAPANESE FRIENDSHIP GARDEN IMPACTED THE COMMUNITY



ABSTRACT: Have you ever been to the Japanese Friendship Garden in Phoenix? If not, then you are in for a treat! The Japanese Friendship Garden in Phoenix, or the RoHoEn, is a Japanese, Zen-style garden in downtown Phoenix. I have had many opportunities to go and perform Japanese classical dancing in the garden, and it is an exhilarating experience to be able to perform in the beautiful, moonlit garden. The clear koi fishpond and teahouse add an air of elegance and beauty to the peaceful ambiance of the garden. In Zen-style Japanese gardening, every element of the garden has symbolism. The creators of these gardens often use symbolism in hopes to create a certain effect on their communities to better the lives of the people in them. Through my research, I will unveil the symbolism behind the garden and the effect the garden had on its outer community.

• **BASIS ADVISOR:** John Goodwin • **ON-SITE MENTOR:** Eiko Saxon • **LOCATION:** The Japanese Friendship Garden

CONNOR T.

BEHIND THE TITLE: AN INSIGHT INTO THE PUBLICATION PROCESS



ABSTRACT: Despite being one of our most ancient technologies, the method of writing has changed frequently, both in terms of the content being written, and actually published. In the past, authors worked with selective publishing businesses whose main goal was, understandably, to turn a profit. However, since the rise of the internet, eBooks, and print-on-demand, more authors have been able to release their novels than ever before. This has led to a shift in a previously ageless industry, one which has shaped global entertainment for generations. I plan to shadow at Jones Media Publishing, an independent publisher located in Phoenix, Arizona. Like most other independent publishing houses, they specialize in a certain genre, which in this case is mostly nonfiction. I intend to work remotely as a low-ranking editor, where I will further gain an understanding on what modern publishers seek in terms of topics and genres, as well as what the editorial process is and what to focus on changing and adapting, through instruction and exposure to the development of published works.

• **BASIS ADVISOR:** Luke Morris • **ON-SITE MENTOR:** Jeremy Jones • **LOCATION:** Jones Media Publishing

LILLIAN U.

RESEARCH TOWARDS HIGH SCHOOL-AGE AUTISTIC STUDENTS AND RESOURCE QUALITY AVAILABLE IN THE ARIZONA EDUCATION SYSTEM



ABSTRACT: The treatment of autistic individuals in education varies from state-to-state, but research in general tends to focus on younger autistic individuals instead of older ones. Arizona is not exactly known for its spectacular education system, and often lacks the funding to properly address its students' needs. This is partially due to a lack of research towards older autistic students which may lead to deficits in proper resources for autistic students in public schools. With a lack of research towards older students, it is possible that certain trends in Autism Spectrum Disorders (ASD) are not being interpreted correctly in regards to funding for special education, leading to negative experiences with an underfunded program in high school. My research into this topic aims to uncover trends in both research subject matter (i.e. older vs younger autistic students) and the ways in which the research is applied to the Special Education Program in Arizona public schools. I will be reviewing a wide variety of sources to synthesize a paper detailing the current research done, the current accommodations given to autistic students in high school, and the effectiveness of said accommodations.

• **BASIS ADVISOR:** Breanna Tompkins

LIAM V.

THE INCREASING CHALLENGE OF INSURANCE-BASED CARE WITHIN THE MENTAL HEALTH SPACE



ABSTRACT: Unfortunately, many people who are in need of mental health care have difficulty obtaining it. With my project, I am researching why that is, and strive to reveal a solution to this issue. According to Mental Health America, over half of adults with a mental illness do not receive treatment, totaling over 27 million adults in the United States who are going untreated, and the percentage of adults with a mental illness who report unmet need for treatment has increased every year since 2011. I am interning at Empower Psychological Services with Dr. Yisroel Loeb, who has a lot of experience as a psychologist, but also with the difficulties posed by insurance. He explains that patients are choosing higher deductibles, meaning that their out-of-pocket costs are higher. Therefore, patients are avoiding the care they need despite having "good" insurance. I am conducting qualitative research, searching for and analyzing data such as observations, questionnaires, and documents from the past in an attempt to gain a holistic understanding of the present lack of accessibility for people who are in need of mental health care. As I learn more about why people are missing out on the mental health care they need, the data will create new questions and ideas for new aspects of the issue to look into, and I am hopeful that a trend will reveal itself and make the causes of this disparity between demand for and acquisition of mental health care abundantly clear.

• **BASIS ADVISOR:** Suzanne Ungar • **ON-SITE MENTOR:** Dr. Yisroel Loeb
• **LOCATION:** Empower Psychological Services

ABHINAV V.

COMPUTATIONAL ASTROBIOLOGY



ABSTRACT: Are we alone in the universe? What makes us living? What could alternative forms of life look like? Over the last ten years, astrobiology, the search for life on the billions of trillions of exoplanets in our universe, has transformed from the topic of science fiction novels to a possible reality. As National Aeronautics and Space Administration (NASA) and other space agencies have collected more and more data on exoplanets, Artificial Intelligence (AI) has emerged as a powerful tool to draw decisive conclusions for scientists. From distinguishing false positives from real exoplanets to conducting mass spectrometry, AI systems have proven to be far more efficient and unbiased than humans. However, no true classification for exoplanets exists currently, and as newly launched telescopes such as James Webb will discover more and more exoplanets, the necessity to categorize them is apparent. I seek to create my own machine-learning algorithm, a semi-supervised logistic regression model, that can categorize exoplanets into distinct categories based on their chemical composition and other factors. The model is unique as it analyzes each exoplanet and determines the probability of it being habitable for life. Dr. Venkateswara's expertise in the machine learning and deep learning fields will help me tremendously in my approach to actually code the algorithm, and Mr. Smith's background in chemical biology will guide me to distinguish chemical factors that truly make an exoplanet habitable for life.

• **BASIS ADVISOR:** Connor Smith • **ON-SITE MENTOR:** Dr. Hemanth Venkateswara
• **LOCATION:** Arizona State University





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ESTEBAN A.

AN ANALYSIS OF FACEBOOK'S RADICALIZATION ON IMMIGRATION REFORM



ABSTRACT: This research paper focuses on measuring the effectiveness of certain speaking platforms on one of social media's most prominent services, Facebook. For the purpose of the study, the success of the supposed speaking platform will follow the reactions of the content. Analyzing Facebook's data bases, the study will analyze the different reactions to social media amongst different news outlets. Taking 3 left wing and 3 right wing news outlets and filtering for immigration activation, this study will determine the most influential headlines and words at gaining popularity on a specific post. Specifically, from there, I can analyze similarities between political ideologies in the realm of immigration control and particularly analyze the radicalization of the media on immigration control. The study will ultimately give essential insight on how the media influences its constituents on immigration reform. Specifically, by analyzing these headlines, I will be able to determine differences between party lines and compare the radicalization of each via a word index I will create. Ultimately, the externship at Promise Arizona will help me analyze the true impact of these news sources as I will be teaching English to non-native speakers and will be directly participating with those affected by these political organizations.

- **BASIS ADVISOR:** Shelby Stringer • **ON-SITE MENTOR:** Christian Serrano, Lead English Instructor
- **LOCATION:** Promise Arizona

ZANE B.

COMPARING THE THEMES OF IMMIGRATION BETWEEN TEXTBOOKS OF CANADA AND THE UNITED STATES



ABSTRACT: High school history textbooks play a substantial role in the political socialization of young people. This project looks at how these textbooks affect views in immigration, specifically in Canada and the United States. Both nations are nations of immigrants, but how the two countries view immigration differs. Canadians see immigration as a mosaic. Canada is a nation of many peoples, and their differences are their strength. However, Americans view immigration as a melting pot. America is also a nation of many peoples who together create a singular nation. The project attempts to examine if these differences are seen in junior high school textbooks of the respective countries and how actively these textbooks try to socialize young people.

- **BASIS ADVISOR:** Shelby Stringer • **ON-SITE MENTOR:** Yaseen Jamaludeen, Board Vice President
- **LOCATION:** Refugee Connection Phoenix

ABHIRAM B.

DESIGNING A MULTIFUNCTIONAL GRIPPER FOR EXTRATERRESTRIAL EXPLORATION



ABSTRACT: Unmanned drones have become a staple for modern-day space exploration, especially extraterrestrial exploration. A vital component of these drones is a robotic gripper that manipulates the environment by collecting soil samples and picking up objects such as rocks. The best of these designs are modeled after the human hand. Through my experience with the Arizona State University Sun Devils Robotics Team, I hope to improve the versatility and effectiveness of the designs, courtesy of the open hand project at Harvard. I plan on doing this by testing various suggestions found in previous research papers and creating an amalgamation of the most efficient ones. Thanks to the robotics team, I will be able to rapidly 3D print and prototype my design, hopefully, seeing it at the university rover competition.

- **BASIS ADVISOR:** Shelby Stringer • **ON-SITE MENTOR:** Natalie Mason
- **LOCATION:** Arizona State University Sun Devils Robotics Club

ALLISON K.

THE EFFECT OF WOMEN'S ACTIVEWEAR PRICE POINTS ON CONSUMERS' PERCEPTIONS OF SUSTAINABILITY



ABSTRACT: Fashion represents identity. Our experiences, passions, and status revolve around the clothes we wear. The businessman, the athlete, and the artist all find expression in the garments on their skin. However, this rise in fashion has also pushed a rise in consumerism and greenwashing. Clothes go from high-end runway to consumer in just days, making fashion fit for every personality widely available at every price point. At first glance, this seems amazing, ideal even. But 'fast fashion' comes at a cost. The cost is hidden supply chains, unethical work conditions, and economic unsustainability. By examining consumers' assumptions about athleisure products at differing price points, this project aims to better understand how marketing, such as greenwashing, has affected consumer biases and understandings of sustainability. As athleisure is one of the largest rising fashion industries, and uses a large quantity of polluting synthetic materials, it's important to explore this field and why exactly consumers continue to indulge in these products. More specifically, it's important to understand what kinds of athleisure products consumers believe they're buying. Are they buying products they believe are high-quality, durable, and useful? Or are they buying products they believe are expressive, trendy, and affordable? By asking such questions, we can better understand how the price point of these products change what the consumers believe they're paying for, and what prior knowledge consumers have to make these decisions. Ultimately, this project will contribute to broader research in fashion marketing and mass consumerism, and how to better combat greenwashing and consumer impulse buying.

- **BASIS ADVISOR:** Shelby Stringer • **ON-SITE MENTOR:** Dr. Catharine Weiss, Associate Professor of Fashion
- **LOCATION:** Lasell University

CANDICE K.

ANALYZING THE EFFECT OF KOREAN BEAUTY STANDARDS ON K-POP FANS IN AMERICA



ABSTRACT: What makes a good song? Beauty may not be the first thing that comes to mind, but it may be more significant than one might think. In the Korean pop music industry, beauty of the artists is almost, if not just as important as the music they make. That beauty is a distinct standard unique to South Korea and uniquely appeals to South Korean audiences. Or does it? As K-Pop continues to dominate foreign markets, the industry exposes itself to fans of culture much more diverse than that of a single country. As idol and fan interactions span oceans and borders, the question of Korean beauty standards and their effect on international fans comes into play. One of the most significant markets resides in the America, and as K-Pop further breaks into this market, the industry garners the majority of its fans in the teenage demographic. In order to study the effect of the attractiveness of K-Pop idols on American fans' perceptions of K-Pop music, I will conduct surveys at BASIS Phoenix high school. After viewing a presentation slide featuring known female K-Pop idols, participants will listen to a song by the idols and fill out a questionnaire examining their perception of the quality of the song. Moreover, results will compare whether having knowledge of or interest in K-Pop music affects these answers. The results will give more insight into how well K-Pop's music reaches international audiences and whether the standards of beauty in Korea contribute to K-Pop's success in America as effectively as the industry hopes.

- **BASIS ADVISOR:** Shelby Stringer • **LOCATION:** Musical Instrument Museum
- **ON-SITE MENTOR:** Lacey Hauser, Retail Manager, and Cheryl Casner, Associate Buyer

PRANJAL K.

THE JURY VERDICT: AN ANALYSIS OF JURY NULLIFICATION INSTRUCTION ON GROUP DELIBERATION



ABSTRACT: Citizens of the United States have the power to overrule the law through jury nullification. According to the Fully Informed Jury Association, jury nullification is "when a jury returns a Not Guilty verdict even though jurors believe beyond reasonable doubt that the defendant has broken the law." How does awareness regarding the power of jury nullification influence/affect the decision-making of the jury, in terms of the individual, and the group? Does group deliberation mitigate the effects of biases? The goal of this project is to evaluate how awareness of the jury nullification power affects one's reliance on bias in a court case, and how much the power influences group deliberation. Jury nullification occurs when a jury returns a not guilty verdict even though jurors believe beyond reasonable doubt that the defendant has broken the law. This research further expands insights in the court and on jury nullification as I will first look into the individual verdict and then evaluate group deliberation and see whether or not personal opinions influence the jury deliberation and verdict. Previous research has tested and evaluated the effects of nullification instruction on an individual's verdict such as Jeffrey E. Pfeifer's "Jury Nullification: The Influence of Judicial Instruction on the Relationship Between Attitudes and Juridic Decision-Making." Many papers have done research similar to this however there is a gap between an individual's verdict and ultimately the jury verdict. Effective research has not addressed the effects jury nullification has on group deliberation. Group deliberation is a vital process in the court system where the jury discusses their individual verdicts and comes to their own verdict. It is the last gateway to a decision however the effects of jury nullification on this process have not been looked upon. As part of my research, I will work with lawyer Marc McCain on addressing potential jury nullification-based cases revolving around ARS 12-716 statutes and drafting legislation regarding the manipulation of said statutes in trial. Such research will allow me to open up for progressive actions regarding the status of legal doctrine's enforcement and interpretations.

- **BASIS ADVISOR:** Shelby Stringer • **ON-SITE MENTOR:** Marc D. McCain, Partner
- **LOCATION:** McCain & Bursh Attorneys at Law, P.C.

SIMRA M.

MUSLIM WOMEN BEYOND IN STEREOTYPES: USING EDUCATIONAL PREJUDICE-REDUCTION SEMINARS TO ADDRESS MISCONCEPTIONS IN ARIZONA



ABSTRACT: According to the Pew Research Center, 53% of Americans say they don't personally know anyone who is Muslim and a similar share say they know "not much" or "nothing at all" about Islam. Yet still, the vast majority of Americans agree that Muslims are subject to some form of discrimination. My proposed study seeks to address one of the root causes of Islamophobic attitudes and anti-Muslim prejudice in Phoenix: lack of contact. Previous studies have recognized the success of Gordon Allport's Contact Theory, which states that contact between two groups can promote tolerance and acceptance, but only under certain conditions. My aim is to refine this broad definition of "contact" within the realm of Islamophobia and ultimately justify that interpersonal dialogue and interaction facilitate meaningful and long-lasting change. Additionally, my project tests the variable of gender, and measures its effective role in using inter-group contact within interfaith work. The proposed methodology will have female and male non-Muslim participants to have conversations with Muslim participants of the respective genders using guided prompts and framed questions, in an effort to explore the quality of their engagement and emphasis on religious tolerance. A pre-test and post-test questionnaire will be given to participants before and after the conversation is held to test their confidence towards the intergroup relationship. I hope to extend the growing discussion on addressing Islamophobia and Islamoprejudice in large cities like Phoenix and identify the specific role Muslim women can play when doing so.

- **BASIS ADVISOR:** Shelby Stringer • **ON-SITE MENTOR:** Tyler Hudgins, Area Director ; Didmar Faja, Head Imam
- **LOCATION:** Multifaith Neighbors' Network and United Islamic Center of Arizona

MADALYN P.

THE IMPACT OF CONFESSIONS ON PLEA DEALS: HOW A DEFENSE ATTORNEY'S ETHICS CAN INFLUENCE THE CRIMINAL JUSTICE SYSTEM



ABSTRACT: In the field of criminal law, a defense attorney is not required to disclose information when their client threatens to harm someone else, although they can. Research has been done on whether attorneys think those rules should be changed, but not on what they would do in a situation where their client's best interest may contradict the safety of others. This project will examine what a lawyer would do when a client implies that they may commit harm. For my external experience, I will be meeting with a criminal defense lawyer weekly to discuss my project. My research method will be to propose a hypothetical scenario in which a client implies they may harm a potential witness in their case and will measure what attorneys will do in response to this scenario and analyze why. I hope to discover how an ethical dilemma will impact the choices an attorney makes and whether an attorney will prioritize ethics over their client's interest.

- **BASIS ADVISOR:** Shelby Stringer • **LOCATION:** District of Nevada
- **ON-SITE MENTOR:** Lisa C. Brunner, Assistant Federal Public Defender, Capital Habeas Unit

ANDREW Y.

A COMPARATIVE ANALYSIS OF ONLINE VS. IN-PERSON DEBATE TOURNAMENTS' EFFECT ON DEBATERS' MENTAL HEALTH



ABSTRACT: Participating in Speech and Debate is like a double-edged sword. Some find the activity relaxing while others find it stressful. A major factor that shapes this experience is the tournament environment. In-person tournaments used to be the norm until the pandemic occurred and online tournaments emerged. Analyzing these two environments are important as the individual experience is directly associated with debaters' mental health. Poor mental health is a known driver of depression, poor performance at school, and potentially death. Lowering the risk that a tournament environment will negatively impact debaters is crucial for students to flourish in the activity and reap the positive benefits like improved public speaking skills. I will be working in Beyond Resolved, a student-led organization that supports marginalized groups, raises awareness in speech and debate, and creates free resources to make this activity accessible and equitable. I hope to create videos for demo debates, and mini-lectures on argument writing to help the debaters most in need to thrive. For my research, I will be using Likert-style Google forms surveys to question debaters about different factors/events to measure the effect on mental health. Surveys are the best way to directly question the population I am interested in and would allow for debaters to easily participate regardless of location. Through my research, I hope to discover whether in-person or online tournaments have a better effect on debaters' mental health.

- **BASIS ADVISOR:** Shelby Stringer • **ON-SITE MENTOR:** Michelle Lu, Advisory Board Member
- **LOCATION:** Beyond Resolved





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