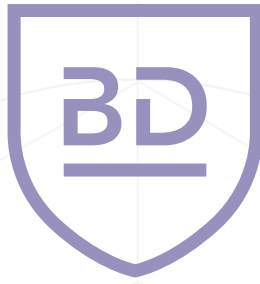


Senior Projects

2022–2023

BASIS FLAGSTAFF



SENIOR 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 Honors Diploma. 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 a student's 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.

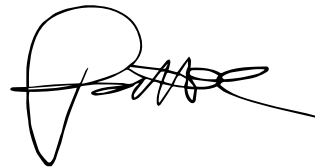
Under the guidance of an external advisor who is a professional in their field, as well as a faculty advisor from their school, students dedicate 10–15 hours per week to the completion of their Senior Project. To document their journey, students post weekly blog entries about their experiences, successes, 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 project summaries 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+



Patti Bezanson
Chief Executive Officer
BASIS Ed Texas

ABBY B.



COSMETIC CONFUSION: SAME PRODUCT, BUT MAKE IT GREEN

SUMMARY: Many consumers are becoming increasingly aware of the negative effects their purchases can have on the environment. These consumers are taking into account whether their favorite products contain ingredients that are directly harmful to human health or produced in such a way that will eventually be detrimental to humans. At the same time, companies are picking up on consumer demand for more eco-friendly products. Some companies respond to this demand by producing more products that are truly environmentally friendly. Meanwhile, other companies simply disguise their products to appear more eco-friendly through a type of advertising called greenwashing. My project evaluates the effects of greenwashing in an industry where human health is at the top of mind: the cosmetic industry. I surveyed a variety of participants through a virtual form, showcasing packaging of imitation beauty products. The results of the survey indicated whether consumers were able to recognize when they were being greenwashed by labels on beauty products. I then evaluated whether this recognition or lack thereof affected a consumer's intention to purchase a cosmetic product. Ultimately, my research seeks to bring more awareness to the practice of greenwashing in the cosmetic industry by showcasing how greenwashing affects consumer purchase intentions.

• **BASIS ADVISOR:** Jessica Buckley • **ON-SITE MENTOR:** McKenzie McLoughlin; Francisca Alvarado •
LOCATION: Northern Arizona University Campus Dining

SARAH B.



WHAT A COLORFUL WORLD?

SUMMARY: Marketers have long used color and color psychology to help attract their audiences. Color has been found to be a significant factor in a consumer's decision to buy a product. However, some people have recently speculated that everyday objects are becoming less colorful. Could this be true for marketing? Are brands using less colors in their advertisements? To examine this, I investigated color use in logos of major S&P 500 companies by creating my own color metrics to compare each version of a company's logo. By comparing logos, I was able to establish whether or not the marketing of these companies was becoming less colorful. Additionally, I worked with Flagstaff Youth Riders (FLYRS) to explore how a small business utilizes color within their marketing. My hope was that through my research, businesses like FLYERS could understand why color is disappearing from marketing and adapt their marketing accordingly.

• **BASIS ADVISOR:** Jessica Buckley • **ON-SITE MENTOR:** Stephanie Adams • **LOCATION:** FLYRS

RYAN C.



NOT A VERY FUN GUY: INVESTIGATION OF CLIMATE EFFECTS ON AN AMPHIBIAN-KILLING FUNGUS

SUMMARY: The emergence of the fungal pathogen *Batrachochytrium dendrobatidis* (Bd), which causes the disease chytridiomycosis, has caused an immense collapse in amphibian populations around the world across many different climate systems. Most commonly, the fungal pathogen is found in mountain freshwater climates. The health of both the amphibian populations as well as their habitats have been threatened by ongoing environmental and anthropogenic factors such as climate, water chemistry, and pollution. Throughout the last few centuries, climate change has caused more extreme climatic events, shifts in ice occurrence, and variations in the timing of pollutant deposition cycles. These factors have an impact on the disease, the host, and disease dynamics. In this experiment, I examined different abiotic variables previously known to control Bd occurrence and chytridiomycosis severity and discussed how climate change may affect them. Specifically, I examined three different abiotic variables that may alter Bd distribution, persistence, and physiology: pH, salinity, and pollution. I performed these experiments at NAU, under the supervision and aid of Dr. Richard Hofstetter, Professor of Forest Entomology. My hope is that a greater understanding of water climate and chemistry as cofactors in the spread of disease will expand our understanding of chytridiomycosis dynamics, and in turn, further efforts to remedy its effects.

• **BASIS ADVISOR:** Amy Green • **ON-SITE MENTOR:** Rich Hofstetter • **LOCATION:** Northern Arizona University

ALEXA H.



THE WANNABE BEETLES: HOW SOUNDS ARE AFFECTED BY WOOD MOISTURE AND TREE WOOD DENSITY

SUMMARY: Flagstaff, Arizona has the largest ponderosa pine forest in the world. One of the beetles that is attacking these trees is the southern pine sawyer beetle, *Monochamus titular*. Our current extreme climate has led to trees becoming more and more stressed, and therefore more susceptible to beetle infestation. Healthy trees are more equipped to resist invasion by secreting a sticky resin that pushes out and traps the beetle. However, the stressed trees are unable to produce as much resin and the beetles are able to enter the tree and lay eggs. There has been little research on attenuation—the diminishment of sound waves' frequencies as they travel through a medium—that focuses on wood as the medium, as opposed to air or water. As part of my project at NAU, we played recordings of two different sounds—five single note pulses (1000 Hz) and a frequency sweep (1000 Hz to 20,000 Hz)—through different log samples of ponderosa pine and Gambel oak trees, and then analyzed the attenuation of the sound waves. The research conducted in this project provided insights into how beetle sounds travel through wood. The ultimate goal was to create a device that can identify the beetle's location in the tree, allowing us to remove only the insect, giving the tree a longer life.

• **BASIS ADVISOR:** Sheri Jordan • **ON-SITE MENTOR:** Rich Hofstetter • **LOCATION:** Northern Arizona University

KUSUMA T.



FLOW DIVERTER VS. INTRA-SACCCULAR OCCLUDER: THE RACE AGAINST SPEED

SUMMARY: Have you ever heard of an aneurysm? An aneurysm is a bulging, weakened area in the wall of a vessel, resulting in an abnormal widening or ballooning. Intracranial aneurysms happen in the brain and are very difficult to treat. The symptoms of an intracranial aneurysm are indefinite, as they can be anywhere from a small headache to becoming partially blind. If you are diagnosed with an unruptured intracranial aneurysm, there are several treatment options available that don't involve invasive surgeries. My research project looked at a patient-specific sidewall intracranial aneurysm and two treatment methods for it. One was a flow diverter placed in the parent blood vessel to divert blood flow away from the aneurysm itself. The other was an intra-saccular occluder, used for aneurysms that are big and wide in size. This device is used by placing it within the aneurysm itself. It grows until the whole aneurysm is filled with the device. As part of my project, I made a computer model of an aneurysm and 3D printed it. I then tested the 3D model using glycerin as the liquid substance to simulate blood flow. My goal in this project was to find out which medical device performs better so that companies like Gore can design better medical devices for people who need them.

• **BASIS ADVISOR:** Amy Green • **ON-SITE MENTOR:** Cody Hartman • **LOCATION:** W.L. Gore

AIDAN Z.



THE BORDER BETWEEN PEOPLE AND THE MEDIA: AN ANALYSIS OF BIASED MEDIA NARRATIVES

SUMMARY: How has political media bias affected the narrative around Title 42 immigration policy? Title 42 is an immigration code that permits the government to more heavily regulate border exchange. The policy, enacted under the COVID pandemic, has been controversial. It has received criticism as a human rights violation to asylum seekers and has been praised for being the only currently effective border control policy. With insight from local media production company KNAU, I examined how local Arizona media portrays Title 42 narratives in relation to mainstream media. I started by collecting all the relevant articles, spanning across the initial use of Title 42 citing COVID-19 as a public health crisis, to the maintaining of the provision under the Biden administration, and finally to the Supreme Court's upholding of the policy. I collected the articles from these major events and analyzed how the content aligns with political narratives. After content analysis, I created a table showing what percent of articles contain content that aligns with left or right arguments. Finally, I commented on what the data reveals about the relationships between Arizona media and national media, and what consequences might come out of bias.

• **BASIS ADVISOR:** Luke Calhoun • **ON-SITE MENTOR:** Gillian Ferris • **LOCATION:** KNAU

The teachers, administrators, staff, and executive leadership of the BASIS Charter Schools network **commend all of our seniors for their perseverance** in their research, and for their hard work throughout their BASIS Charter School journey. We give **our most heartfelt congratulations** to them for their achievements thus far, and these projects are only the beginning!



Flagstaff

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