

Senior Projects

2022–2023



BASIS MESA



SENIOR PROJECTS

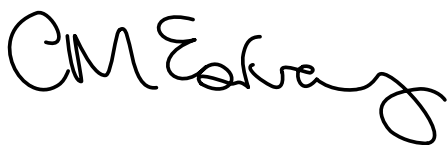
At this point in their senior year, BASIS Charter School students have completed a set of four BASIS Capstone classes to earn their BASIS Honors Diploma. In addition, many students are in the process of completing the prestigious College Board's AP Capstone Diploma™, a challenging, two-year sequence 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



Mesa SENIOR PROJECTS

VIOLET E.

A DISARMING SENIOR PROJECT: A STUDY IN PROSTHETIC DESIGN



SUMMARY: Prosthetics have fascinated me since before I can remember; the possibilities seemed endless. The first time I truly fell in love with the industry, however, was in the past year when I stumbled across a photo of a pole dancer wearing Sophie de Oliveira Barata's stiletto-shaped prosthetic leg and seeming so wholly comfortable and graceful that his confidence was tangible. Thrilled, I dove deeper into her work in prosthetic design and found photos and videos of countless other amputees with prosthetics that matched their personalities and styles seamlessly. While I've heard many amputees feeling uncomfortable or self-conscious with a prosthetic, Sophie de Oliveira Barata's designs seem to test the boundaries of prosthetics to truly allow a person's prosthetic to be their own. To push those boundaries myself, however, I must learn them first. For my project, I wanted to gain experience in multiple facets of the prosthetics industry by shadowing an orthotic and prosthetic practitioner and a physical therapist. Individually, I investigated both orthotics and prosthetics through the upper limb. I wanted to design and produce a wrist hand finger orthosis (WHFO), as well as explore the emerging potential in 3-D printed prosthetics. For both, I looked into both the medical and artistic facets of long lasting and personal mobility aids by experimenting with their potential as works of art and fashion while maintaining practicality and functionality.

• **BASIS ADVISOR:** Dawn Ventura • **ON-SITE MENTOR:** Kristen Severson • **LOCATION:** Gilbert, AZ

ABBY F.

BEFORE "HAPPILY EVER AFTER": THE ART OF STORYTELLING IN PRE-PRODUCTION ANIMATION



SUMMARY: I've always felt the magnetic force of art and storytelling on my energy and attention, almost always consuming my day-to-day thoughts. Especially at the seed of creation, ideas, and concepts. I scoured the internet for storyboards and the development art for my favorite shows and movies, a facet of animation I would later come to know as "Pre-Production." Pre-production animation is a vital component of any animated product, as it consists of the construction and shaping of every project. In order to weave this intricate thread together, an idea must make its way through concept work, character and prop design, scriptwriting, and finally storyboarding. The art of worldbuilding and design in this process is typically accomplished by a team of professionals over an extended period of time, as they very carefully assemble and establish a set of believable characters within a captivating setting. For my project I learned from Kelly Koay, a lighting and compositing artist who has worked for Disney and DreamWorks in feature films such as "Moana," "Zootopia," and "How To Train Your Dragon 2." Kelly constructed a 10-week course based on the pre-production side of animation. My goal was to draw from her wisdom and create a visually compelling story in a short time frame. I planned to construct this original story by applying the new principles and techniques that I learned over the course of these weeks, culminating in an animatic, which is a sequence of storyboards put to a soundtrack, and featuring an excerpt of my own original tale.

• **BASIS ADVISOR:** Adam Engle • **ON-SITE MENTOR:** Kelly Koay • **LOCATION:** DreamWorks Animation – Virtual

LOGAN K.

“HECTIC” POLITICS



SUMMARY: The United States House of Representatives seats and one-third of Senate seats are up for election every two years. The United States Constitution designed this system when it was written that, “The House of Representatives shall be composed of Members chosen every second Year” (Constitution of the United States, art. 1, sec. 2) and “So that one third may be chosen every second Year” (Constitution of the United States, art. 1, sec. 3). These elections captivate people — including me. Even though these elections intrigued me, I realized federal elections are less likely to impact one's life significantly. On the contrary, local politics relies on people in one's community, directly affecting one's life. I visited local political events in my district, allowing me to meet and speak with those representing my community (Specifically State Senator David Farnsworth and Congressional Representative Andy Biggs). The goal of my project was to discover the ins and outs of local politics while shadowing a state senator and following their day-to-day operations. I also interned at Congressman Biggs's district office. My experiences allowed me to discover how to involve myself in local politics. I also analyzed why bills fail to be enacted into law, which I employed in my creation of a legislative bill. My analysis and knowledge of party platforms allowed me to write a bill that I believe would pass the Arizona Senate and House that is legal according to the U.S. and Arizona Constitutions.

• **BASIS ADVISOR:** Greg Thorson • **ON-SITE MENTOR:** David C. Farnsworth • **LOCATION:** Arizona Capital

CASSIDY L.

A LESSON IN GAMING: USING VIDEO GAMES TO TEACH STRENUOUS SUBJECTS



SUMMARY: How do students stay engaged in their classes? Games have been utilized in classes to teach students certain material in a fun and engaging manner. My research involved creating my own game to teach tough educational topics in an effective manner. I worked with Ryan May, the Head of Software at Nikola Motor Company, to learn more programming skills. My goal was to create a game that helps teach one or more difficult educational subjects in an uncomplicated manner for kids to understand.

• **BASIS ADVISOR:** Evan Hillis • **ON-SITE MENTOR:** Ryan May • **LOCATION:** Nikola Motor Company

ARJUN N.



THE SIGNIFICANCE OF STUDENT STRESS: CREATING A VISUAL CURRICULUM

SUMMARY: Sixth grade at BASIS was the first year I took Pre-Comp exams, and my first real run-in with standardized testing. I recall being so anxious for these tests that I barely got any sleep the night before, and on the morning of the exams, I felt deathly ill. I look back at this time and pity myself, both because I was so incredibly stressed for the most insignificant tests, but also because I didn't know half of what I know now in relation to stress. Students, such as my sixth-grade self, are taught high-level math, science, language, literature, and art, but are never taught emotional maturity, stability, or how to navigate our own well-being. With such an inability to handle stress, students make themselves vulnerable to the long-lasting side effects of consistent anxiety, such as the deterioration of prefrontal cortex activity, which includes cognitive control. I wish to empower my fellow students with the ability to bolster their resilience and kick stress to the wayside. By working with a professor at Mesa Community College, I am began learning the fundamentals of adolescent psychology, especially the neurobiology behind stress responses and stress relief. I also assisted a student at MCC with their project on the plague of stress for police officers and the efficacy of support programs for those officers. Once I understood more about the mechanisms that bolster resilience in academic settings, I tried to distill what I learned into streamlined, straightforward public service posters that schools can utilize immediately, so that any students who finds themselves in a similar situation to what I experienced years ago, has the knowledge and capability to manage it.

• **BASIS ADVISOR:** Lauren Humphrey • **ON-SITE MENTOR:** Robert Keone • **LOCATION:** Mesa Community College

BRIANNA P.



RECIPE FOR SUNSHINE: A CONNECTION BETWEEN BAKING AND SOCIAL WORK

SUMMARY: Despite being based on good intentions, the foster care system can create a very isolating experience. In the United States alone, there are over 391,000 children in the system. Due to this extensive number of kids in the system, oftentimes kids can feel that they have simply become another case number for someone to deal with. Additionally, depending on the child's background, they may feel that others do not understand the trials they face, and, as a result, become withdrawn from people and even activities they previously enjoyed. Having spent time in this system myself, I know just how some of these experiences feel, which is why I decided to work with For Goodness Cakes, a non-profit organization that bakes and delivers cakes for kids in foster care and similar situations. During this time, I had the opportunity to research ways to broaden the outreach of this organization, delve into social media research, plan, and execute events, learn about the foster care system on a deeper level, as well as bake celebratory cakes to effectively bring sunshine to kids' lives and let them know that there are people who truly see them and do care. I took what I learned and created my very own themed cookbook that visually embodies how I've been able to spread joy.

• **BASIS ADVISOR:** Thomas Turner • **ON-SITE MENTOR:** Leslie Nilson • **LOCATION:** For Goodness Cakes

DITI P.

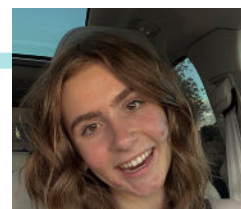


LET'S CUT TO THE CHASE: PROGRAMMING A DOBOT® TO CUT VEGETABLES

SUMMARY: Today, robots are used to perform surgery, pick up items from a warehouse, or aid around the home. As technology advances, the presence of robots in everyday life increases. The popularity of the Roomba, a vacuuming robot that uses sensors to create a visual map, is just one-way robots are increasing human efficiency. Robots can be programmed for many different tasks which makes robot technology much more accessible — people only need to invest in one robot. One such robot is a Dobot® Magician, which is capable of grabbing, writing, drawing, laser engraving, and 3D printing. It also has four degrees of freedom or axes of motion, meaning it can execute many motions. For my senior project, I worked in the robotics lab at the ASU Polytechnic Campus. More specifically, I focused on programming a Dobot® to cut a variety of vegetables, specifically, slicing a Russet potato into five pieces. I also explored how the cutting mechanisms of the Dobot® can be improved using a more complex robot called a Cobot. Because Cobots have six degrees of freedom, which is very close to the seven degrees of freedom of a human arm, they can mimic human vegetable slicing much more closely than Dobots. The programming methods used were drag-and-drop coding and Python coding respectively. Through this experience, I wanted to learn more about robotic kinematics and programming while creating an application that could be used to make cooking more efficient.

• **BASIS ADVISOR:** Vince Silvestro • **ON-SITE MENTOR:** Sangram Redkar • **LOCATION:** Arizona State University

MEGHAN S.



BUILDING BRIDGES, NOT WALLS: UNDERSTANDING THE IMMIGRANT EXPERIENCE

SUMMARY: I am the very proud daughter of an immigrant mother. She was separated from her father for years, living in their native Poland — while he worked multiple jobs in the U.S., barely making minimum wage. My life has thus been influenced by the work-ethic everyone in her family forged when subsisting in the States to ensure their children and grandchildren could experience the “American dream.” I’m blessed that influence has shaped my own identity and, more recently, my career aspirations. The field of law has interested me for several years now, so for this project, I was pleased to be able to work with a local immigration attorney who aids clients from all over the world. She is one of the few legal professionals in Arizona who brings corporations to the U.S., in addition to individual families. When attempting to narrow down the focus for my project, I came across a poem by Gilda Ochoa concerning separation in immigration, “Too many politicians and other institutions / Perpetuating atrocities / Implementing policies / Fueled by rhetoric dehumanizing” (1-4). Rhetoric Dehumanizing. These words still send a shiver down my spine, amplified more so now that I have witnessed these corrosive moments in our clients’ journeys. Navigating the bureaucracy, I was most excited to learn how my mentor brings out the humanity in this process, which is notorious for being mired in legal jargon, as this is something she prioritizes at her firm. Through this internship, I learned how to write application letters, sift through stacks of documents for the select few that augmented our case, the different types of immigration visas individuals can qualify for, as well as ambiently learn about the human stories that bring people to our country. I want to use artistic means — making a quilt using fabric my grandpa made and creating visual images that I will digitally draw — to represent those who, like my family, are coming in hopes of comfort and embrace.

• **BASIS ADVISOR:** Don Swantko • **ON-SITE MENTOR:** Jessica Cadavid • **LOCATION:** Cadavid & Associates

STELLA S.



CIVIC SUSTAINABILITY: HOW PEOPLE KEEP UP WITH LOCAL ENVIRONMENTALLY CONSCIOUS EFFORTS

SUMMARY: I am someone who has almost always been aware of climate change, and the drastic effects it can have on people. We, as humanity, need to better our earth. I have always tried to do my part to clean up litter and better my surrounding environment, but to make an impact, it is imperative to go much deeper than that. The sphere of government is ultimately one of the biggest methods of intervention when it comes to the climate crisis, and local governments all over are creating sustainable ways to live in our ever-changing world, especially by focusing on effects that will immediately help the local environment. For my Senior Project, I worked with the City of Mesa, and learned how sustainability and environmental outreach is achieved, as well as how effective it can be. In turn, I took pieces of information that I learned, and turned it into an easily digestible, increasingly relevant source for environmental education, to further educate young adults who are the key to shaping the future. An online space that makes it easier for younger generations to get involved in combatting global warming in whatever way possible, empowers us all to take action over our future.

• **BASIS ADVISOR:** Emily Brown • **ON-SITE MENTOR:** Donna DiFrancesco • **LOCATION:** City of Mesa





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!



Mesa

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