Senior Projects
2023–2024

BASIS MESA

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 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 each student's 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 students' 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. 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. 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, DC, LA

David Hubalik
Chief Executive Officer
BASIS Ed Texas


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Mesa
SENIOR PROJECTS

ALEX H.

ONE MAN'S DREAM: CREATING A ONE-MAN SHOW

SUMMARY: I first developed my interest in performing arts when I began taking classes in my fourth-grade year at BASIS Mesa. In my school's drama program. I learned lighting, sound design, improvisation, blocking, set design, how to write monologues and scenes, and acting for the camera. I attended several shows starring members of my school's faculty, specifically The Crucible and The Secret Garden. My most challenging role was the Cowardly Lion in the schoolwide production of The Wizard of Oz, not only because I had to work with younger children, but also because I had to sing in front of a large audience, which was quite difficult. For my Senior Project, I interned at Places! Productions as a general assistant with their production of Urinetown, learning about choreography, sound design, and collaboration. I am also currently in rehearsals for our school's production of Beauty and the Beast. While it is fun, I have also been able to see that theater is a tool to teach others about difficult subjects. To address my struggles with special needs, I wrote, performed, and filmed a one-man show based on my life experience. I hope to advance people's knowledge of autism with my show and entertain them.

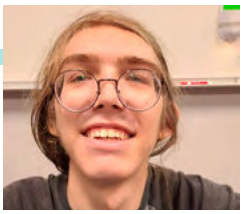
• **BASIS ADVISOR:** Kasey Ray • **ON-SITE MENTOR:** Allison Zuccaro • **LOCATION:** Places! Productions

FRANK L.

AI-POWERED FUTURE: GENERATIVE ADVERSARIAL NETWORKS AS A DIGITAL MANUFACTURING TOOL FOR DATA PROCESSING

SUMMARY: Computer science has interested me ever since I first learned how to code in middle school. I saw coding as a way of bringing my imagination to fruition by making simple game programs. As a craze around generative Artificial Intelligence began with the release of ChatGPT, I grew interested in the possibilities that machine learning algorithms could provide. By efficiently processing mass amounts of data, AI has the power to revolutionize the future of business, entertainment, and almost every part of daily life. Therefore, I sought to better understand AI and play an active role within this growing trend. At ASU's Data Analytics & Insights in Manufacturing research group, I worked as a student research assistant. In my role, I aided several different projects all focused on the creation of AI models for aiding digital manufacturing. These models were based on deep learning neural networks, a system of AI learning built upon layers of interconnected nodes that mimic the way a human brain works. The main project that I worked on used the generative AI framework of Generative Adversarial Networks (GANs) for analyzing and creating resistance spot welding images. Using my experience as a research assistant, I learned more about the number crunching methods that AI models rely upon and figured out how to code neural networks in python with software libraries like TensorFlow.

• **BASIS ADVISOR:** Felecia Scanlan • **ON-SITE MENTOR:** Shenghan Guo
• **LOCATION:** Arizona State University, Data Analytics & Insights in Manufacturing Research Group



TANIA N.

INSPIRATION: PUBLIC LIBRARIES

SUMMARY: From a young age I've loved books, and as I grew so did my love. Yet, even before that, I had been spending time at the library. All in all I grew up alongside both. Hence, it seems only natural that I'd seek to work at one, and so was my project decided. That is but only half of the project. For the final product, I wrote and illustrated a book.

• **BASIS ADVISOR:** Maya Cave • **ON-SITE MENTOR:** Cory Black • **LOCATION:** Mesa Public Library

BELLA O.

ENGINE & EMPOWERED: EXPLORING WOMEN'S ROLES IN CARS

SUMMARY: I was first introduced to the world of race cars during COVID when I accidently turned on a Formula 1 race and felt captivated watching the cars drive at incredible speeds. I was surprised to see the number of people on each team in the garages looking at data and executing speedy pit stops. I became dedicated to learning more about the sport through watching YouTube interviews with people who worked as a mechanic or strategist and began to watch IndyCar as well. For this project, I learned from Harry Clark and others at Classic Promenade who buy and sell classic cars. I produced a documentary-style video including content from discussions with women specifically to gain insight into their experiences in the automotive world, and how they entered such a male-dominated industry.

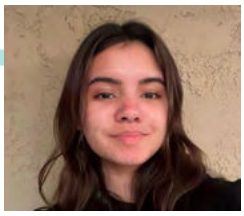
• **BASIS ADVISOR:** David Kirschner • **ON-SITE MENTOR:** Harry Clark • **LOCATION:** Classic Promenade

CONNOR O.

ARS FABRICANDORUM ARMORUM: THE ART OF FORGING ARMOR

SUMMARY: For my 16th birthday, I asked my mom to give me a lesson at a blacksmith's shop. I had the opportunity to tour his shop beforehand, and, in my first lesson, I forged a simple J-hook. At that point, my interests and abilities were limited to only swords, knives, hammers, and tools. For my 17th birthday, I was gifted Mark Aspery's "Mastering the Fundamentals of Leaf-Work" and became fixated on the idea of creating decorative leaves using "Repoussé" techniques. Soon thereafter I realized that these skills were nearly identical, if not harder, than those required to produce plate armor. During my senior project, I have been determined to learn all techniques necessary to produce armor of any era, such as raising, forming, and creasing. To do so, I needed to first create the extensive number of different tools required to do so, and then test those tools using my knowledge to produce a Roman Imperial Gallic Helmet. I consulted expert blacksmiths such as David Goodman at Iron Rhino Forge, who specializes in traditional ironmongering, and Michael Allenson at Allenson Armory, who creates historically accurate sets of armor for medieval competition fighting. To maintain the historical accuracy of my piece, I also conferred with Mr. McMath's colleague from the University of Arizona, Matt, who studies archaeological examples of Roman armor. With the guidance of all these experts, I produced a period-accurate replica of the Imperial Gallic Helmet entirely from scratch, using only tools I have made in my backyard.

• **BASIS ADVISOR:** Thomas McMath • **ON-SITE MENTOR:** David Goodman • **LOCATION:** Iron Rhino Forge



VALERIA R.

OLD GLORY: THE FIERY INTERSECTION OF ART AND POLITICS

SUMMARY: Because most of my energy during my time at BASIS was spent memorizing biology terms or solving integrals, I wanted my Senior Project to be humanities-related to pinpoint my passions in that field. At the Phoenix Art Museum, my site advisor Aspen introduced me to the most controversial exhibit in its history, called Old Glory: The American Flag in Contemporary Art. This 1996 exhibit included the American Flag in a toilet and draped on the floor for visitors to walk on, causing plenty of protest and discourse about the freedoms granted by the First Amendment. I have spent my time at Phoenix Art Museum gathering the binders and boxes of scattered Old Glory letters, news clippings, and photos from around the archives room into one organized place, receiving a glimpse into the life of a museum curator. This project has allowed me to explore my interests in history, art, and politics in a workplace setting while also creating a crochet representation of my own perception of the American flag as the daughter of Mexican immigrants.

• **BASIS ADVISOR:** Adam Engle • **ON-SITE MENTOR:** Aspen Reynolds • **LOCATION:** Phoenix Art Museum

HAYDEN V.

KACHOW: THE QUEST FOR SPEED

SUMMARY: Ever since I was young, I enjoyed working on cars. Some of my earliest memories were me watching my dad work on his 1959 Jeep FC150. I loved the sound, look, the way my hands would turn black with grease and oil. Every time I was working on a car was time for me. It transitioned to me getting my own project car when I was 13, a rusty Datsun 280Z, the car that started the American love for Japanese cars. I interned at an automotive modification and tuning shop called UMS Tuning. They are known around the world for their fabrication and tuning on race cars designed to compete at the global stage. Tony Szirka, the owner, has been racing for 20 years and has a philosophy which is to take the time and create the best possible product. I also interned at a performance shop called TurnStyle JDM & Euro. They are a smaller and newer shop, but Matt, the owner, and his team have a fountain of knowledge for me to absorb. I learned from both sites and used the knowledge I gained on my own personal product, which is my 1975 Datsun 280Z. It is a restomod, having the car stripped down and rebuilt from the ground up. I completely repainted the car, adding a 1 of 9 body kit from Dubai, refreshing the engine and transmission, and much more.

• **BASIS ADVISOR:** Tyler Williams • **ON-SITE MENTOR:** Tony Szirka • **LOCATION:** UMS Tuning

STEVEN Z.

THERE WILL COME SOFT NOTES

SUMMARY: The ultimate goal of being a musician is to perform. There is often a disconnect between the practice room and the stage, which causes the sorrowful, "Well, I don't know what just happened out there—it's always worked in the practice room." The easiest, and perhaps only, way to bridge practice and performance is to practice performing. To prepare to be a music major, I performed for audiences at Banner Gateway, Inspira Gateway, and Banner Baywood. Lastly, I gave a short recital for the string students at BASIS Mesa. From this experience, my hope was to become a better performing musician for various audiences and occasions.

• **BASIS ADVISOR:** Joel Rangel • **ON-SITE MENTOR:** Lisa Law • **LOCATION:** Banner Gateway

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