



BASIS MESA

SENIOR PROJECTS 2021-2022

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



Mesa SENIOR PROJECTS

RILEY B

LET'S MAKE SOME NOISE: SONGWRITING AND MUSIC PRODUCTION



ABSTRACT: For my Senior Project, I intended to solidify a handful of original ideas I've conceived during my time learning to play guitar, and venturing into live solo performance. I've used at-home software to record my ideas, written new work, and edited it. As a final stage to the project, I've gained some experience performing live at local venues.

• **BASIS ADVISOR:** Jeff Van Dusen • **ON-SITE MENTOR:** Greg Norris • **LOCATION:** Remote

BRIANNA H

WRITING A GOTHIC/HORROR SHORT STORY



ABSTRACT: My senior project involved reading psychological, gothic, and supernatural horror novels. For each book, I analyzed certain components written in the story that evoke cases of chills running up the spine, a fear of being alone in the dark, and the compulsion to hide underneath the covers when the lights go out. I then synthesized what I learned from these written works and wrote a selection of short stories of my own in an attempt to uncover the secrets that go into making an emotional piece of writing.

• **BASIS ADVISOR:** Samantha Briggs • **ON-SITE MENTOR:** Randy Lindsay • **LOCATION:** Remote

AYUSH K

ALL POLITICS IS LOCAL



ABSTRACT: This project aimed to discover how medical care is affected by local government, and morphed into a survey of local government offices. By working with the Mayor's Youth Committee in Mesa, I was able to spend time in wildly varying departments--recreation, energy, waste disposal, even the mayor's office. The project gave me insight not only into policy, but into the individual stories that inspire it.

• **BASIS ADVISOR:** Don Swankto • **ON-SITE MENTOR:** Melissa Randazzo
• **LOCATION:** Office of the Mayor of Mesa, Arizona

ELISABETH P



DIGGING INTO NEW YORK

ABSTRACT: My Senior Project explores the cuisine culture in New York City, specifically the downtown neighborhoods of Chinatown and Little Italy. This spring, I researched and visited New York City to experience famous restaurants and delis, all the while, filming everything. Ultimately, using all of the footage from restaurants and interviews, I crafted a documentary with the goal of explaining a historical place with something everyone can relate to: food!

• **BASIS ADVISOR:** Lauren Humphrey • **ON-SITE MENTOR:** Casey Neistat • **LOCATION:** New York City

ANIRVIN P



COMPONENTS OF BICYCLE GEOMETRY AFFECTING STABILITY

ABSTRACT: My Senior Project rendered a stability index for two prominent aspects of a bicycle's geometry (rake angle and moment of inertia), and compared the two to see which has a greater bearing on stability. For example, a 5% increase in rake could cause the ratio of restoring force to bar input to increase by a certain percentage, a metric which I compared with that of moment of inertia. I attempted to build a bike with an additional joint fastened to the steering column that allows the rake angle to be adjusted, and a wheel placed on the front axle that can be spun opposite to the direction of travel to cancel out the gyroscopic behavior.

• **BASIS ADVISOR:** Milan Patel • **LOCATION:** Remote

SYDNEY S



SPACE IMAGE CALIBRATION: JWST MIRAGE FOR NIRCAM

ABSTRACT: Through an ASU research group with Rogier Windhorst and Seth Cohen, I used the python-based Multi-Instrument Ramp Generator (MIRAGE) in Jupyter Notebook to create simulated data. It involved reducing images of galaxies to better apprehend their general shape & gravitational effects can provide a better view into galaxy formation. These uncalibrated images run through the JWST processing and calibration pipeline where I used SAOImage ds9 image viewer to ensure that the JWST pipeline is functioning properly. Specifically, I handled the images from the Near Infrared Camera (NIRCam).

• **BASIS ADVISOR:** Jacob Kramer • **ON-SITE MENTOR:** Rogier Windhorst / Seth Cohen
• **LOCATION:** Arizona State University School of Earth & Space Exploration

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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