

**Giles T. Brown Student Project
and Research Symposium**



March 6, 2020

Thank you

Deans Michael Sutliff and Tara Giblin conceived of this wonderful opportunity for our students in early 2016, and we thank them for their guidance and dedication over the years.

This event is made possible by the leadership of Symposium Committee chairs Hannah Kang and Rachel Ridnor who worked MANY hours with the following 2020 Symposium Committee members over the past year to communicate with students and mentors, lead and assist student workshops, and carry out all of the challenging and rewarding tasks of hosting the Symposium: Dean Abernathy, Melissa Archibald, Lori Cassidy, Audrey Crouse, Katherine Donahoe, Kelli Elliott, Robert Ellis, Jerome Fang, Neil Godfrey, Ulrike Green, Amy Hellman, Jon Mochizuki, Duy Pham, Brent Rudmann, and Mark Wishon.

A deep appreciation the many staff, faculty, and administrators who volunteered as evaluators for student presentations, as well as, to the student volunteers to help run this event.

Thank you to the Planetarium Director, Scott Mitchell for the use of the indoor and outdoor space for student posters & exhibitions of work and the Symposium luncheon & awards ceremony.

The Symposium breakfast and luncheon for student presenters, mentors, evaluators, and committee members was graciously funded by ASOCC!

A special acknowledgement to Kevin Ballinger, Vice President of Orange Coast College, for his continued support of the Symposium.

We'd like to thank and welcome OCC's new President, Angelica Suarez to the Giles T. Brown Student Project and Research Symposium!

Finally, we extend a huge thank you to the inspired and hard-working student presenters and their faculty mentors who made today a success by sharing their diverse projects with the campus community.

Schedule

Time	Event	Location
9:00am	Breakfast (presenters, mentors, evaluators, and committee members)	Planetarium (outside)
9:30am- 10:30am	SESSION 1: Oral Presentations	BioSci 100, 102, 200, and 204
9:30am- 10:30am	Evaluation of Posters and Exhibitions (no public viewing)	Planetarium (inside)
10:30am- 11:10am	Performances	Planetarium (inside)
10:45am- 11:45am	SESSION 2: Oral Presentations and Performances	BioSci 100, 102, 200, and 204
11:00am- 12:00pm	Poster Presentations and Exhibitions (public viewing)	Planetarium (inside)
12:15pm	Lunch (presenters, mentors, evaluators, and committee members)	Planetarium (outside)
1:15pm- 2:00pm	Award Ceremony	Planetarium (outside)

Table of Contents

Oral Presentations schedule.....	6
Performances schedule.....	10
Posters and Exhibitions of Work schedule.....	11
Abstracts.....	12
Giles T. Brown.....	42

Oral Presentations

Session 1: 9:30am-10:30am

Locations: BioSci 100, 102, 200, & 204

There will be four concurrent sessions (A-D) divided among the rooms listed above. Each oral presentation or performance has a 20-minute time allotment: 15 minutes for the presentation or performance and 5 minutes for questions.

1 - A BioSci 100

Avida Martinez and Luc Wu, *The Importance of Trade in the Ancient Mediterranean*

Mentor: Sif Goodale

Clara Passos Xavier Alonso, *How Graphic Design Played an Important Part on World War II*

Mentor: Steve Cox

Omar Al-Muhtasib, *The Ugly Truth About Crooked Teeth: The Effects and Causes of Malocclusion*

Mentors: Nakisa Nowroozi and Erin Walsh

1 - B BioSci 102

Damian Valenzuela, *Mass Incarceration of African-Americans throughout History in the United States*

Mentor: Mark Wishon

Anna Hollister, *How Funding Inequities Within California's Public Education System Affect Voter Turnout in Elections*

Mentor: Ann-Marie Williams

Syed Zia Hussain, *The Effect of New Dense Housing Developments on Walkability in Costa Mesa*

Mentor: Dean Abernathy

1 - C BioSci 200

Fernando Aguirre, *Understanding Sleep Patterns in College Students*

Mentor: Daniel D. Lane

Devin Ardalan, *International Students' Help-seeking Behavior, Perceived Adjustment, and Academic Success*

Mentor: Alix Ziff

Casey Cunningham, Hy Dao and Maryam Shabankareh, *Application of Neurogenesis by Stem Cells in the Treatment of Alzheimer's Disease*

Mentor: Duy Pham

1 - D BioSci 204

Belen M. Cairo and Angela Willhite, *How Bad is Your Breath? Ask the Fishies! The Effect of Large Group Visitation on pH of Various Systems in the OCC Aquarium*

Mentors: Robert Ellis and Karen Baker

Nyssa Guidangen, *Commercial Sunscreen Effects on Coral Invertebrates*

Mentor: Robert Ellis

Jonathan Kuse, *Preservation Plan for Lichen in Joshua Tree National Park*

Mentor: Kelli Elliott

Oral Presentations

Session 2: 10:45am-11:45am

Locations: BioSci 100, 102, 200, & 204

There will be four concurrent sessions (A-D) divided among the rooms listed above. Each oral presentation or performance has a 20-minute time allotment: 15 minutes for the presentation or performance and 5 minutes for questions.

2 - A BioSci 100

Chase A Baburov, *Soviet Union Impact on World*

Mentor: Melissa Archibald

Bridget Devlin, *Alcohol Consumption in Colonial America*

Mentor: Brent Rudmann

Samuel Levine, *The Modern Space Race*

Mentor: Melissa Archibald

2 - B BioSci 102

Maegan Aronson, *Nurture the Mother*

Mentor: Rachel Ridnor

Celine Tran, *Western Beauty Standards and Asian American Women*

Mentor: Ulrike Green

Shideh Zokaïy, *Society's Criminals: The Homeless*

Mentor: Rachel Ridnor

2 - C BioSci 200

Adam Huh, *The Necessity of Space in Order to Know and Care for the World*

Mentor: Philip Simpkin

Nolan Thompson, *Machiavelli: The Prince*

Mentor: Jason Ball

Brea Browne, *Lost or Found: The Authenticity of Film*

Mentor: Philip Simpkin

Fiona Evans, *Catastrophic Colonialism: An Examination of Masculinity in Alejo Carpentier's, The Kingdom of This World*

Mentor: Laura Wagner

2 - D BioSci 204

Carolyn Nguyen, Rachel Devlin, Vincent Zhang, Nick Molzon, and Ricky Phan, *Compostable Food Packaging Alternatives*

Mentor: Erica Tseng

Cheyenne Sherrill, *Gravitationally Lensed Galaxy Analysis*

Mentor: Nicholas Timmons

Performances

10:30am-11:10am

Location: Planetarium

10:30am-10:50am

Santiago Rivera, *"The Understanding of an Empty Room",
A Choreographic Study on Human Relationships*

Mentor: Shana Menaker

10:50am-11:10am

Mairead Staunton, *The Significance of Nostalgia in Irish
Music*

Mentor: Eliza Rubenstein

Posters and Exhibitions of Work

9:30am-10:30am Presenters and Evaluators only

11:00am-12:00pm Presenters and General Public

Location: Planetarium

Posters

Kanav Aggarwal, *Vegan Diet Effects on Health and Environment*

Mentor: Lee Gordon

Tuleen Al Harastani, *Diabetic Cardiomyopathy*

Mentor: Steven Chang

Connor Cuomo, *Use of Fentanyl Test Strips to Prevent Drug Overdose*

Mentor: Amy Hellman

Johan Digiovanni, *Navigating Your Financial Future*

Mentor: Mark Grooms

Mario Garrido, *Transparent Solar Panels*

Mentor: Michael Sutliff

Hannah Hanson, *The Effect of Intersectional Gender-based Micro-aggressions in Academic and Social Settings*

Mentor: Andy Stuart

Johnny Huynh and James Davis, *Building an Advanced Brushless DC Motor*

Mentor: Angelo Esposito

Cameron Law and Jasper Webb, *Investigating the Relationship Between Spiral and Elliptical Galaxies Over Time*

Mentor: Jerome Fang

Christine Le, *Narrative Versus Normal Memorization*

Mentor: Hannah Kang

Laura Liptrap, *The Underground Railroad: Harriet Tubman, Non-Written Narratives, and Confronting History's Erasures*

Mentor: Jon Mochizuki

Brandi Mahnken, *Perplexing Parthenon Sculptures*

Mentors: Irini Rickerson and Lee Gordon

Kate Lyn Nordstrand and Luc Wu, Flygskam, *Climate Change, Consumers, and Corporations*

Mentor: Lisa Snyder

Maggie Polite, *Glycolic Acid in Skincare*

Mentor: Cecilia Schreyer

Rosario Reyes, *Kinetic Acoustical Ceiling Systems in Open Multipurpose Spaces*

Mentor: Dean Abernathy

Richie Vu, *Does Spatial Mapping Technology Match Up to Human Recognition Ability?*

Mentor: Justin Jang

Emily Vandercook, *Sustainable Packaging Using Mycelium*

Mentor: Yilin Wang

Exhibitions of Work

Bodhi Edwards, *Computational Fluid Dynamic Comparative Analysis of Common Surfboard Tail Designs*

Mentors: Angelo Esposito and Steve Fuchs

Thu The Le, *Intelligent Automation Robotics*

Mentor: Angelo Esposito

Robert Stell, *Neurophysiological Correlates in Narcissistic Personality Disordered Individuals*

Mentor: Jordan Stanton

Abstracts (listed alphabetically by student)

Kanav Aggarwal, *Vegan Diet Effects on Health and Environment*

Vegan Diet has gained popularity in recent years due to its several health benefits, mitigating climate change, sustainable environment and ethical treatment of Animals as opposed to meat based diets. There has been data proving that Vegan diet not only reverse diseases but also regenerate cells by boosting the body's own recovery mechanism by providing necessary conditions. The literature review of previously conducted research and meta analysis have been compiled to conclude the results. According to scientific research published in "Nature", the effects of plant based diet on overall reduction of body weight and insulin resistance are significant. High BMI is precursor to many health disorders overtime like cardiovascular disease and diabetes. There was also a comprehensive systematic review of research published on "Pubmed" that revealed the benefits of Vegan diet on overall body function including Microbiome health, optimum nutrition, reduction in carcinogen and inflammatory protein, improving insulin sensitivity and also improving mental health by indirect means. The effects of Bio-accumulation and Bio-magnification are also reduced as the amount of toxins entering the system through meat is refrained. Another study revealed the far-reaching effects of Vegan diet on the planet if followed by the mass and how it can solve most of the current world problems like food security, public health, sustainability, resource burden and climate change. It is conclusive that adoption of Vegan diet will play an integral role on the health and the environment.

Fernando Aguirre, *Understanding Sleep Patterns in College Students*

Not getting enough sleep costs the US economy approximately \$4B. According to the National Sleep Foundation (NSF), 20% of teenagers get less than 5 hours of sleep compared to the average of 6.5 hours. Undergraduate college students report getting one hour less than the daily recommended average of 8 hours. Research shows a correlation between sleep and cognitive function; therefore, it is reasonable to posit that poor sleep will reflect poor academic performance. To understand this relationship, relevant research articles were examined to understand the components of sleep and how academic performance could be measured. By comparing quality and quantity of sleep to grade point averages (GPA), it was found that college students did not sleep long enough and well enough to achieve their desired grades or achieve learning goals. Students slept more than an hour sleep less than recommended time during the weekday and found themselves into over 6 hours of

sleep debt and on the weekend tried to recover lost sleep. Research showed there was a curvilinear relationship between total sleep time and GPA. Sleep deprived students achieved over .10 grade points less on a 4.0 scale as compared to non-sleep deprived students. Higher GPA correlated positively with more consistent sleep schedules. Students achieving better day-to-day sleep reported higher learning goal achievement such as test performance. Considering the abundance of independent research and data, it is quite clear that the sleep has a strong influence on academic performance and cognitive function. Poor sleep can lead to lower grades, fewer internship opportunities, less over all college success. This translates into reduced career opportunities, salaries and future success.

Tuleen Al Harastani, *Diabetic Cardiomyopathy*

This is a literature review that is mostly clinical based and is discussing a research project that was conducted to gain a better understanding of diabetic cardiomyopathy and if the type of diabetes matters in this case. In the past few years, type 2 diabetes mellitus has been increasing in a rapidly epidemic proportion that increases the chances of obesity which can markedly increase the risk of cardiovascular disease across the globe. Several studies disclosed an elevated risk of heart failure in patients with type 2 diabetes. The U.K. Prospective Diabetes Study (UKPDS) reported 4585 patients and showed that an increase in Hemoglobin-A was combined with a significantly high risk of heart failure in patients that have diabetes mellitus. While the main cause of death in diabetic patients is represented as ischemic heart disease, diabetic cardiomyopathy sums up the effects of diabetes mellitus on the heart that are separate from coronary artery disease and hypertension. Diabetic cardiomyopathy raises the risk of heart failure and ejection fraction. Various molecular mechanisms have been suggested to determine diabetic cardiomyopathy that partly overlap with the ways believed to contribute to heart failure. Nonetheless, the existence of diabetic cardiomyopathy remains a topic of argument, although the clinical importance of diabetic cardiomyopathy is progressively identified by scientists and clinicians. Furthermore, comparatively very little attention has been associated with the fact that both underlying ways clinical features of diabetic cardiomyopathy may be partially noticeable in type 1 in contrast to type 2 diabetes, and it seems that each type differentially affects the heart. Type 1 diabetes has a significant role in leading to heart failure, microvascular dysfunction, and fibrosis. On the other hand, in type 2 diabetes, the clinical features may include cardiac hypertrophy and diastolic dysfunction.

Omar Al-Muhtasib, *The Ugly Truth About Crooked Teeth: The Effects and Causes of Malocclusion*

Over 66% of the U.S population has some degree of malocclusion (improper alignment of the upper and lower teeth), and it has become a norm that once you turn of a certain age, you seek orthodontic treatment to achieve straight teeth. The causes of malocclusion are unknown in 95% of cases. Although prevalent in today's society, malocclusions are rare within the preindustrial skeletal and prehistoric fossil records. To explore the reason for this high rate of malocclusions in modern society, a thorough search of PubMed electronic database was performed and various studies in the literature were compared and contrasted. In this brief review, three studies were summarized and discussed. One study was on rats and the negative impact of a soft food diet on the development of the jaw. The second study explores the role of certain orinasal habits (nasal breathing and tongue position) in the development of the proper dentofacial structure. The third study shows a high prevalence of malocclusion among non-breastfed children. In conclusion these studies suggest that in order to avoid malocclusion in future generations: it is advised to consume whole tough foods, practice proper orinasal habits, and promote breastfeeding for a period of 6 months.

Devin Ardalan, *International Students' Help-seeking Behavior, Perceived Adjustment, and Academic Success*

International students are a major intellectual and financial resource to community colleges. There are approximately 1391 international students enrolled at Orange Coast College, and numbers are expected to increase. These students struggle with adjusting to a new social and academic environment in their host country. Understanding these students' needs, behaviors, and struggles are crucial for student recruitment and retention. This paper aims to understand the relationship between international students' perceived adjustment difficulties and their academic success. A key component to understanding this relationship is examining help-seeking behaviors and the use of campus resources as a mechanism of adjustment, a topic that has received little attention within the literature. This study uses an online survey to collect data about OCC international students' (1) demographics (2) self-reported GPA (3) self-reported mental health (4) English language ability (5) acculturative stress and (6) use of and opinions regarding campus resources. The survey will illustrate the relationships between GPA and the variables above and which factors predict the use of available OCC campus resources. By understanding this relationship, this paper aims to assist the administration in better serving international students' who are an essential aspect of academic life.

Maegan Aronson, *Nurture the Mother*

Postpartum depression (PMD) is a social issue that affects more than 10% of women who have children. Thousands of individuals are affected by this and yet nothing is being done to prevent it or solve it once it manifests. A handful of celebrities have shared their personal battles with postpartum depression, and while helpful, have hardly shed light on a problem every mother is at risk of experiencing. This research will delve into the neurological changes mothers undergo and why some are better candidates for PMD than others. What are some commonalities between mothers who have been diagnosed (iron levels, difficulty of pregnancy and/or labor, support, etc.)? As with many topics, one can hypothesize that biological makeup is equally important to the environment of the mother and child. Why are some mothers with ideal environments still susceptible to the darkness of PMD? Utilizing empirical articles and studies to find common occurrences in the health, pregnancy and delivery of subjects could lead this project into larger qualitative data research. Interviews will be conducted with healthcare professionals and mothers to ensure the research has ethnographic support as well. Sample size is small in hopes that this exploratory research could lead to larger studies in the future. These findings are relevant and important to future Americans simply because we all found our way into this world by means of a mother. If we helped support the beginning of the next generation's life by nurturing the mothers of this current generation, what positive impact could we have on the world? At the very least, this project will help even the most stable mothers prepare and navigate the "baby blues" in the days immediately after delivering.

Chase A Baburov, *Soviet Union impact on World*

In an effort to spread the ideology of Socialism throughout the world, the Soviet Union had a heavy influence on many countries located near the former Soviet Republics. Due to the gargantuan size of the Soviet Union, the Socialist sphere of influence ranged from Central Europe to Asia. Throughout most of Eastern Europe and Central Asia, the Soviet Union had established satellite nations in order to spread Socialism. Not all satellite nations accepted the values and principles of the Soviet Union, countries like the Czech Republic protested against the Soviet Regime and tended to align more with the standards of Western Europe. In addition to the protests of the Satellite Nations, the Soviet Union also faced resistance from their own republics, specifically the three Baltic nations. When comparing the economies of European Nations, a large imbalance can be seen in the GDP of countries that were influenced by the Soviet Union and countries in

Western Europe; However, satellite nations and soviet republics that rebelled against the idea of Socialism and the Soviet Union now share a much higher GDP than nations and republics that did not. Therefore, the influence of the Soviet Union negatively affected every nation it encountered but especially impacted the Nations which embraced its theories and depended on Socialism for economical development. After the fall of the Soviet Union in 1991, nations like Serbia and Bulgaria suffered immensely due to their dependence on the Soviet Union. The fall of the Soviet Union was partly caused by two wars in the 1980s, the Soviet-Afghan war, and the Nagorno Karabakh war. The war in Afghanistan was caused by an aggressive regime that focused on continuing the spread of Socialism in Central Asia. The people of Afghanistan rebelled and fought against Soviet aggression until the war proved to be too costly for the Soviet government, leaving a vicious blow on the economy of the Soviet Union. Another war that sparked the fall of the Soviet Union was the Nagorno Karabakh war which created a contradiction in the Socialist values and caused disunity amongst the Soviet Republics. All in all, the Soviet Union was unsuccessful in its twentieth-century expansion and several events throughout history prove that the spread of Socialism caused economic hardships and was ultimately a failure.

Brea Browne, *Lost or Found: The Authenticity of Film*

In Walter Benjamin's *A Work of Art in the Age of Mechanical Reproduction* it is suggested that the authenticity or aura of art is lost in reproduction. Specifically looking at the films *Titanic* and *12 Years a Slave*, it will be considered if these films offer a lack of authenticity to the true historical events that occurred. While both movies received high acclaims, including the Academy Award for Best Picture of their respective years, the question that arises through Benjamin's work are they genuine works of art? By comparing the two films to its historical facts we will see that there are positives and negatives to reproducing. Benjamin suggests, with films social significance, a psychological relief is present at the cost of the 'traditional value of cultural heritage.' Through this presentation I will show that the preservation and authenticity of history can be obtained through the art of film. However, in doing so there is a lack of authority to the historical testimony present, just as Benjamin stated over eighty years ago.

Belen M. Cairo and Angela Willhite, *How Bad is Your Breath? Ask the Fishies! The Effect of Large Group Visitation on pH of Various Systems in the OCC Aquarium*

In aquatic ecosystems, rapid changes in pH have been shown to have significant physiological impacts on marine life, such as reduced calcification and growth rates in corals and some

plankton. When dissolved in water, CO₂ decreases the pH, and this can have global implications in the form of ocean acidification due to rising levels of atmospheric CO₂. The doors at the OCC Aquarium are constantly revolving with large numbers of visitors, and with that, sudden pulses of increased carbon dioxide over a short time frame. The student run aquarium houses freshwater, saltwater and estuarine systems which all have different capacities to resist shifts in pH. Therefore, this is the perfect testing environment to understand the degree of impact these systems underwent when carbon dioxide, from human respiration, increased over a set time frame. During OCC Community Science Night, we measured the pH in different systems to observe changes that would result in lower pH conditions. From these results, the data suggested that the respiration of almost a thousand visitors did lower the pH and may even lead to longer term health impacts. As the number of visitors continues to expand, improved ventilation may be needed to help reduce rapid pH shifts and moderate the already stressful environment associated with substantial quantities of visitors to the aquarium facility.

Casey Cunningham, Hy Dao and Maryam Shabankareh,
Application of Neurogenesis by Stem Cells in the Treatment of Alzheimer's Disease

Approximately 5 million people who live in the United States have Alzheimer's disease (AD) (Crews L. and Masliah E.), a disease characterized by cognitive impairment and progressive loss of neurons, the cellular building blocks of the brain specialized to rapidly transmit information to other cells of the body. Alzheimer's disease progresses as amyloid- β plaques (protein disks) build up in our brains, preventing intercommunication between neurons (Crews L. and Masliah E.). Furthermore, AD causes the protein fibers that are responsible for neuron nourishment to become tangled and dysfunctional effectively building neurofibrillary tangles. (Crews L. and Masliah E.). As a result, malnourished neurons that are incapable of communicating with one another begin to die in the process of neurodegeneration. This paper reviews therapeutic methods of utilizing stem cells, cells that are undesignated to a specific cellular purpose, in the articles, "Neural stem cells improve cognition via BDNF in a transgenic model of Alzheimer disease" and "Effects of neural stem cell transplantation in Alzheimer's disease models". The first study showcases transplanting neural stem cells (NSCs) in mice's brains to investigate the effect of increasing neuron density in overcoming AD's cognitive impairments, while the second study demonstrates the role of NSCs in breaking down the protein disks and tangles that cause

neurodegeneration. Although neither of the studies mentioned in the aforementioned articles has experimented on humans, their optimizing results indicate that the method of employing neural stem cells is a groundbreaking and viable approach in the treatment of Alzheimer's disease.

Connor Cuomo, *Use of Fentanyl Test Strips to Prevent Drug Overdose*

Overdose deaths in the United States have risen dramatically over the last decade. In 2017, 40% of the 70,000 overdose deaths involved a synthetic opioid such as fentanyl. The inability to reliably predict potency, combined with the exceptionally low lethal dose for fentanyl, often results in people who use drugs (PWUD) unwittingly consuming dangerous levels of fentanyl. According to estimates by the Society of Actuaries, opioid related mortality cost the U.S. over \$60 Billion in 2017. Fentanyl Test Strips (FTS) allow minimally trained PWUD to rapidly test a small sample for the presence of fentanyl. Despite FTS technology being widely available and relatively inexpensive, data regarding its use popularity and the willingness of PWUD to use FTS as a harm reduction tool are limited. In order to assess participants' willingness to use FTS to prevent fatal overdose, an anonymous online survey was created using SurveyMonkey and disseminated through drug specific forums on Reddit.com. Out of 73 respondents, 76.7% agreed that a positive fentanyl test would prompt a modification of their drug use behavior. Out of 70 respondents, 71.4% reported they would use a lower dose upon confirmation of fentanyl contamination, while 32.9% would dispose of the sample entirely. These results are consistent with similar studies found in literature. Widespread use of FTS could modify drug use behavior in PWUD, thereby decreasing the rate of opioid overdose and overdose related death. With increased frequency of use, FTS could ultimately lower costs and save lives.

Samuel Levine, *The Modern Space Race*

One sweltering hot September day in 1962, President John F. Kennedy gave a speech to a crowd of 40,000 Americans. "For the eyes of the world now look into space, to the Moon and the planets beyond..." This speech would encapsulate the nation's focus and determination for the next decade. This unity and grit was seen immediately after America's first major step into space, during the flight of the first American into space. Douglas Brinkley describes Shepard's historic flight in his book, *American Moonshot: John F. Kennedy and the Great Space Race*. Brinkley writes "The experience bonded the entire nation, rekindling the collective American spirit like nothing since V-J day at the close of World War 2." Now, once again, our nation is on the verge of

great discovery and accomplishment, as we repeat history in this, our modern Space Race. Now we look to both revisit the moon and embark on an “untried mission to an unknown celestial body”: Mars. In this lecture, I will outline the history of the Space Race from the 1960s and show the parallels with our modern Space Race. My history of the Space Race will focus on its military origins and transformations into a scientific and ideological race. In doing so I will demonstrate that the present race is following a parallel path driven by profit that similarly focuses on exploring another celestial body through new technologies. I will argue that the present race can only be understood from this historical perspective.

Bridget Devlin, *Alcohol Consumption in Colonial America*

It is common knowledge that one of the biggest pastimes for college students is drinking. In 2012, 80% of college students - 17 million- drank alcohol, which is two times the population of New York City (Gordner). Curious to see how drinking in America today compared to early colonial America, where different gender roles, social life, and types of alcohol would have been a stark contrast to today's standards, I found that alcohol played an important part in social, economic, and political life. I gathered my research from past literature that was written on the subject of alcohol in the colonies. Records showed that from the mid-1600s to the American Revolution, the colonial era had one of the highest alcohol consumption rates in U.S. history- stemmed mostly from the lack of safe, purified water (Smith 65). Women had a greater impact on the brewing of beer than many realize today, and the founding fathers often drank when they mulled over ideas that would eventually create an independent nation (Meacham 119; Curtis 89). Taverns, a new American business, stemmed from English ordinaries but had their own colonial twist: a place for people to gather and discuss over all types of drinks, particularly rum (Curtis 79). From the pious clergy, to Native Americans, to slaves- everyone drank, whether it was for social, political, or medical reasons (Curtis 75; Meacham 121). Even the students at Harvard University revolted when there was a beer shortage on campus in 1639 (Smith 45). Alcohol was a staple in the beginning of America and continues to be today, where over 60% of Americans consume alcoholic beverages (McCarthy). Over the course of centuries, the American drinking culture has changed- such as an increase of consumption by females, or stayed similar, as seen in the college fraternity and sorority dynamic, where men have control over the alcohol (Hensel). Alcohol shaped America's early culture back then, as today's drinking habits will no doubt shape the future.

Johan Digiovanni, *Navigating Your Financial Future*

Young adults are confronted with many financial conundrums when pursuing an education. The purpose of this project is to outline common dilemmas a college student may face. Then, to provide potential solutions to each of these financial problems. Specifically, this project will identify each degree or certificate within education, from an Associates to Ph.D., and weigh the cost of the degree against its income generating potential. We will also be exploring the viability of different methods to finance a college degree. Finally, each educational path will outline a lifelong financial path to retirement. Therefore, this project will discuss the efficacy of different retirement plans and inherent problems within each. Present and future value formulas are used to demonstrate the benefits of a higher education and strong retirement plan. This project also utilizes secondary data, such as statistics, collected from government sources. The purpose of the statistics is to reveal the amount of debt students have and project future growth of various jobs with various levels of education. There are three main objectives of this project, the first is to display the difference in earning potential between different degrees and level of education. The second objective is to highlight effective strategies in order to successfully retire on-time. The last objective is to provide financial awareness and outline the different methods to finance an individual's educational goals.

Bodhi Edwards, *Computational Fluid Dynamic Comparative Analysis of Common Surfboard Tail Designs*

The geometry of the modern surfboard, unlike the heavily researched materials that go into it, is still largely based only on the experience of individual shapers. Some proprietary research has been done to attempt to explain the phenomena shapers consider in the designs they create. However, surfboard shaping is still far from being an exact science having computer-based analysis only recently being applied by the surfboard shaping community. Through use of ANSYS Fluent Computational Fluid Dynamics (CFD), a range of tail designs were tested in two static performance conditions. To best simulate ocean water, the k-omega Shear-Stress-Transport turbulence model was used with liquid-state water fluid data. The first set-up simulated the initial drop into a wave, while the second simulated the surfboard cutting the advancing wave at an angle. The geometry of a surfboard's tail, being one of many design considerations, is one of the easiest to isolate for analysis due to the fact that changes in this area narrowly affect the design of the rest of the board. The results indicated that tail shapes having a more tapered geometry performed with the least amount of drag and generated low

turbulence, offering high performance in large wave conditions while tails that were wider and less tapered produced more lift, offering maneuverability in smaller wave conditions. These findings, while consistent with surfboard design theory, help to shed light on exactly how tail design affects performance. A continued computational approach to shape analysis could publicize and organize treasured shaper knowledge.

Fiona Evans, *Catastrophic Colonialism: An Examination of Masculinity in Alejo Carpentier's, The Kingdom of This World*

The French colonization of Haiti is an open wound that continues to leave its mark on Haiti and those who've lived under its influence. This tragedy serves as the basis for Cuban author Alejo Carpentier's, *The Kingdom of This World* (1949), a novel that explores the impacts of colonialism and the events surrounding/following the Haitian Revolution of 1804 through the varying gendered perspectives of both Haitian slaves and French and Haitian aristocrats. Through his narrative focal points, Carpentier establishes a link between the idea of masculinity and an individual's sensory experiences. In particular, this project focuses on the novel's use of gendered auditory signals as a method of exploring the differing relationships/perspectives that colonizers and colonized individuals have towards masculinity. Placing the primary text into conversation with the post-colonial psycho-analytical theoretical framework established in Frantz Fanon's *Black Skin, White Masks*, this project departs from Fanon's theory of the actional man to propose that colonialism influences the development of a complex rooted in reactive behaviors against the oppressor's masculinity. This research's observations about the relationship between sound, colonialism, and masculinity strives to show audiences the value and necessity of literature in gaining a dynamic understanding of how colonialism affects individuals and societies on a personal and emotional level.

Mario Garrido, *Transparent Solar Panels*

Mentor: Michael Sutliff

Obtaining power from the sun is something we have pursued since the seventh century BC. Since that time we have worked to improve each new invention of solar panels to obtain more energy from the sun. Solar panels mechanism, using Photovoltaics to convert solar cell energy from the sun into electrons thus creating energy naturally. This benefits the environment and reduces the negative impacts that play a major roll in air pollution. The purpose of my study it so to help faculty, staff, and students at Orange Coast College understands the value and benefits of using solar energy. Benefits such as improve campus

energy utility, and cut operational costs leading to an increase in a course that benefits students. Applications to obtaining solar energy are consistently evolving. For example, the first transparent solar panels were designed to change the way solar cells absorb light (Lendino, 2015); Besides it has also been determined that the use of quantum dots can be placed on any window to achieve higher energy efficiency (Klimov, 2018). This process is another step in the evolution of solar energy technology. The development of research in solar energy is ongoing. Based on current findings it's recommended that our institution investigate the cost and operation of the quantum dots process. The findings suggest a less expensive alternative to traditional solar panels. These types of changes will enable Orange Coast College to become more efficient and take full advantage of the new solar energy technology.

Nyssa Guidangen, *Commercial Sunscreen Effects on Coral Invertebrates*

Seventy percent of the world's reef ecosystems are experiencing a phenomenon known as coral bleaching. This is where coral animals expel their symbiotic algae constituents as a result of increased marine tourism and coastal renovations introducing chemical contaminants into the waters. Multiple studies have concluded that oxybenzone, an FDA-approved active ingredient found in a variety of personal care products, may be linked to inability of these animals to quickly overcome these worsening environmental stressors. As a result, the state of Hawaii has proposed a bill to ban the sale of sunscreen containing oxybenzone. The purpose of the study was to test at what concentrations oxybenzone containing sunscreen products elicit physiological responses in coral invertebrates against presumably reef-safe sunscreen products containing completely natural ingredients. Statistical data was collected by dosing calculated amount of liquefied sunscreen solution aliquoted from the brands Neutrogena, Banana Boat, and Raw Elements for over a period of four weeks. Observations such as the physiological responses exhibited by the corals including weight loss, decreased respiration rates, and visible color loss were recorded and compared to the control tank. We found that sunscreen products containing oxybenzone produced the most adverse physiological responses in comparison to reef-safe products that showed little to no response. Based on these findings, it is safe to conclude that reducing the sales of products containing benzophenone derived chemicals may be the eco-friendliest strategy to alleviate the negative environmental impacts and promote sustainable tourism around popular reef ecosystems.

Hannah Hanson, *The Effect of Intersectional Gender-based Micro-aggressions in Academic and Social Settings*

Micro-aggressions are committed every day; however, both the perpetrators and victims may not realize this normalized and pervasive problem. An example that many would like to sweep under the rug, is when faculty put down or do not give students support in academic or research, based on their intersectional identity. Micro-aggression is defined as “A statement, action, or incident regarded as an instance of indirect, subtle, or unintentional discrimination or prejudice against members of a marginalized group such as a racial minority” (Oxford English Dictionary). To collect data, the survey used contains 11 multiple choice and short answer questions to collect data on micro aggression that has been experienced. This survey study of OCC and CSUF students will be combined with academic journals and literature to show that the micro-aggressions committed can be seen reflected in the literary texts and through the student experience. With the data collected and analyzed, this will be compared to the works of literature and academic journals that discuss micro-aggressions and the awareness that is needed, such as Rankine’s *Citizen*. The data will be analyzed to discuss this pervasive problem on a much larger scale. The reasoning for this is to allow a multi-discipline look at the problems that students face because of intersectional gender-based micro-aggressions. If micro-aggressions affect academic opportunity and learning as well as social support and interaction for college students, then awareness and training of students and faculty is needed to solve micro-aggression in and out of the classroom. With standard deviation and sampling error in mind, the results of the data collected and analyzed from both CSUF and OCC remain consistent with the hypothesis of college students being negatively affected by micro-aggressions.

Anna Hollister, *How Funding Inequities Within California’s Public Education System Affect Voter Turnout in Elections*

Differences in resources among California’s public schools create an unfair disadvantage where academic advancement and success is based on the economic status of the school district’s residents. This resource disparity directly relates to ill-informed voters participating in elections. Previous studies have shown the educational resource discrepancies between inner city and suburban schools, but this project compares the differences between rural and suburban communities in California- and how those educational experiences relate to electoral outcomes. The purpose of this project is to investigate the political results that stem from these educational funding disparities by juxtaposing two Californian school districts: Laguna Beach School District (i.e.

LBSD: per capita income of approximately \$79,000) and Plumas Unified School District (i.e. PUSD: per income capita of approximately \$28,000). Data revealed that PUSD had lower graduation rates, test scores, parent participation rates, and teacher retention rates. Resources, including electives/AP classes, teachers, school administration, educational technology (such as laptops, tablets, etc.), and broadband internet connection were all found to be significantly less accessible in PUSD than in LBSD. Additionally, data expresses that rural citizens are more active as voters than suburban or urban residents. Because rural citizens lack the resources needed to fulfill an accomplished education, it creates a dichotomy of voters; those who are ill-informed and those who are well informed. The direct result of this imbalance of educational opportunities are predictable patterns in voter tendencies, especially in emotionally-driven and popular elections. To combat an ill-informed electorate, citizens need to obtain access to a fair academic playing field. To achieve this, educational funding should be increased in school districts with residents of lower economic status, such as in rural districts.

Yejin Hong, *Hydrogen Fuel Cell Vehicle Technology Outlook*
Mentor: Angelo Esposito

Hydrogen fuel cell vehicles are projected to be the prospective solution to handle environmental problems associated with traditional fossil-fuel-dependent automobiles. The fuel cell technology to power vehicles is zero-emission, meeting the urgent needs of humankind to produce energy in an environmentally friendly way. Unfortunately, hydrogen fuel cell cars face technological and economical hindrance to be commercialized for widespread use. This study is dedicated to explore various aspects and prospects of hydrogen fuel cell vehicle technology, as well as barriers it has to overcome to successfully penetrate the transportation market. One possible direction for further research lies towards searching for more affordable catalysts that can replace platinum, which is unrivaled in its effectiveness as a catalyst in electrochemical reactions. The spot price of platinum has discouraged them to compete with other conventional forms of cars in the market. Studies should also be invested on analyzing infrastructure development needs, such as hydrogen fueling stations. Currently, there are about 40 stations in the United States, mostly concentrated in California. Through this research, I will primarily analyze the up-to-date technological status in the United States, and make insightful observations regarding future outlook of hydrogen fuel cell vehicles.

Adam Huh, *The Necessity of Space in Order to Know and Care for the World*

In Plato's *Timaeus*, we are given a rational explanation of how and why the best possible cosmos came to be. Timaeus's discourse takes us on a journey through a universe ordered by geometric patterns, ensouled orbits, principles of elemental natures, and divine causes that function according to a logic of spatial relations. That is to say, the reasons for their particular *modus operandi* are to be sought in their spatial properties, as well as those of the cosmos itself. About midway through the dialogue, Timaeus stops his speech upon realizing its inability to account for the transitory nature of the world as perceived through the senses. He decides to start all over again with the introduction of *chora*, a "metaphysical foundation for space" conceived by necessity to ground the logical conditions upon which knowledge of the impermanent world can be accessed by the rational mind. Towards the end of his discourse, Timaeus asserts the point that by achieving a rational epistemology of the sensible world, we can come to find a divine harmony with it by relating to its rational order, one that is also to be found within ourselves. Through the mention of key points taken from secondary literature on the role of space in the *Timaeus*, the ethical implications of its cosmology, and Platonic views on nature and the divine, the paper will discuss the potential for an epistemology of the world to help generate an affective sensibility for the participation in the improvement of its health. I will also touch upon implications for such a strategy for environmental ethics in the context of advances in scientific knowledge today, and globalized availability of information.

Syed Zia Hussain, *The Effect of New Dense Housing Developments on Walkability in Costa Mesa*

Walkability is a term used to measure the foot traffic in an area with respect to the distance from home to amenities. It supports health and economy growth of the city. The city of Costa Mesa has developed new dense residential area with a design that would encourage more walkability with placing high density housing design, nearby market places and streets that are convenient to walk and cross roads. My research analyzes whether the new dense housing development is producing the intended results in comparison to the older less dense neighborhood. The study focused on six neighborhoods three old ones and three new walkable higher density neighborhoods. The pedestrians were counted in residents survey about their alternative form of transportation during the work day and weekends. Results showed that new housing development design and amenities do not seem to increase or support alternative form of transportation. The survey showed that old established neighborhoods have more people act on the streets. The research results arise a question whether the design or the affluence of the

new dense residencies is inversely affecting the growth of alternative forms of transportation.

Johnny Huynh and James Davis, *Building an Advanced Brushless DC Motor*

Engineers utilize skill and knowledge of physics, chemistry, technology, and math to design and improve various types of systems and processes. More specifically, engineers have produced very powerfully, yet very simple, motors, known as Brushless Direct Current (BLDC) motors. Brushless motors are suited for manufacturing applications because of their precision speed-torque properties, high power density, high efficiency, wide speed ranges, and low maintenance. These motors can be found useful in our generation today when it comes to powering windmills, rotating a propeller of a plane, and even powering hybrid vehicles such as an electric bike/skateboard. This project was used to develop our understanding of such motors for future motor design and manufacturing. In addition to researching the mechanics and electrical aspects of the BLDC motor, we also had a large model 3D-printed for improved visual understanding and producing a motor that actually works.

Jonathan Kuse, *Preservation Plan for Lichen in Joshua Tree National Park*

Lichens are a key component of what is known as Biological Soil Crusts (BSC) to maintain a stable desert environment. Lichens are important in controlling soil erosion by weaving their fibers to hold soil in place during strong storms, some lichens are also involved in fixing nitrogen in the soil for plants. There are roughly 17,000 species of lichen found throughout the world, 1500 of these reside in California, and 145 in Joshua Tree National Park (JTNP). This project focuses on a few of Joshua Tree National Park's common lichens in order to emphasize their importance. Lichen families Acarosporaceae and Physciaceae are found in rockier areas like Skull Rock, Lost Horse Mountain, and Wonderland of Rocks and *Clavascidium lacinulatum* and *Collema coccophorum*, which are commonly found around Cholla Garden and Blue Rock campground. Unfortunately, the lichen's fibers are no match for human activities, such as hiking or automobile traffic. And recovery, under the best circumstances, takes five to seven years to get started, with most lichen taking fifty years to grow just a few centimeters. The outcome of this project is to use strategies of education, enforcement, and exclusion to allow the public to appreciate the beauty of JTNP without destroying some of the fragile and vital organisms that dwell there.

Cameron Law and Jasper Webb, *Investigating the Relationship Between Spiral and Elliptical Galaxies Over Time*

Studying galaxies is a complex task because each object takes billions of years to form and no two are exactly alike, which makes identifying trends difficult without first classifying them. In the nearby universe, the classification of galaxies relies heavily on their visual appearance, such as the presence of spiral arms or a smooth, elliptical shape. Meanwhile, in more distant galaxies, the typical approach is to categorize galaxies according to how fast they form stars, i.e. their star formation rate. It has been shown in previous studies of nearby galaxies that spirals have a higher star formation rate than ellipticals. Our goal is to determine if this correlation holds at earlier times in our universe's history. Our approach utilizes Galaxy Zoo, a citizen science project which provides data on the visual appearance of distant galaxies. Using this data, we divided our sample into two categories: spirals (5200 objects) and ellipticals (4000 objects). For each category, we measured the average star formation rate and how it changes over time. At fixed mass, spirals consistently form stars at a higher rate than ellipticals. Additionally, we found that star formation rate decreases over time for both galaxy types. These results show that the correlation between visual appearance and star formation has persisted over the past 10 billion years.

Christine Le, *Narrative Versus Normal Memorization*

Students utilize different techniques to remember course material. Few studies have found that students retain information better when they create their own story embedding course concepts (the narrative method) rather than use rote memorization to remember the concepts (Ge, 2015). These studies, however, have not been tested on community college students and examining these methods would provide better study tools for students. Twenty-two community college students in an experimental methods class at Orange Coast College participated in the study. A between-subjects design was used with half of the class creating a story out of the words to memorize the material while the other half of the class memorized the material using rote memorization. Both groups memorized the list of 15 words in two minutes before they were given one minute to recall the words. Results indicate that those who used rote memorization recalled more words than those who used the narrative method, but the results were non-significant. Despite the storytelling group utilizing a potentially unfamiliar method to memorize the words without practice, they recalled almost as many words as the controls group. Given a larger sample size, more time to memorize the words, and clearer

instructions, community college students might benefit from the narrative methods to study more effectively.

Thu The Le, *Intelligent Automation Robotics*

Mentor: Angelo Esposito

My goal was to construct an insect robot that can go to small and dangerous areas without risk of casualties. The robot has 6 legs and each of them consists of 3 joints (equipped with 3 servo motors), giving overall dimensions of 25x30x10 cm³. It was first designed using SolidWorks (a 3D modeling software), and then built from 3D printed parts (body and legs) and off-the-shelf parts (electric and electronic components). The robot also has an arm used for grasping and maneuvering actions. For the arm, I used another 4 MG996R servos for the shoulder, elbow, wrist, and hand. Along with all the motion functions, the robot is equipped with a camera and HC-SR04 ultrasonic sensor, that can be oriented thanks to 2 SG90 micro servos. For the electronic connections, EasyEDA (circuit design software) was used to create a PCB board working perfectly with Arduino Mega 2560. The hardest part was to teach the machine how to follow commands. For that, Arduino IDE coding is used to actuate the servos from 0 to 180°. An ad-hoc Application was developed to remote control the robot. The results are very promising as the robot can carry up to 2 lbs. It can go on uneven soil and climb up a 20° incline. Also, the camera and sensor enable it to recognize obstacles and go around them. The robot will be further tested to explore and collect data.

Laura Liptrap, *The Underground Railroad: Harriet Tubman, Non-Written Narratives, and Confronting History's Erasures*

This research examines slaves' minor narratives that contend with dominant official histories regarding escape and freedom. Minor narratives are non-written forms of communication, such as African quilting, music, and code words, while official histories are prevalently represented as written histories in national archives or official documents. The research reveals that official historical writings not only put into question the figure of Harriet Tubman, but also contribute to the mythologization of non-written histories, like secret encoded messages and slaves' stories of escape. As such, this research analyzes sources that are skeptic of Tubman and the non-written histories. Thus, the investigation searches to orient its lens towards scholarship that exposes "official" histories that undermine non-written abolitionist sources and brings to the forefront non-written narratives as viable and significant contributions of making history. Thus, this scholarly work offers a reparative reading when studying the Underground Railroad, and the people that crossed and guided its

path. The conclusions show that non-written narratives offer another historical side while official historical narratives suppress if not attempt to erase slaves' and African American experiences.

Brandi Mahnken, *Perplexing Parthenon Sculptures*

Built in 432 BCE and dedicated to the Patron Goddess Athena of Athens, the Parthenon is a symbol of precision, wealth, and democracy. The abduction of Parthenon sculptures in the early 19th century by Lord Thomas Bruce of Elgin created animosity between Greece and Britain. Through the inspection of many books and articles on this subject, it is clear that there is no legal documentation provided in favor of Lord Elgin removing the sculptures. Key arguments in favor of the marbles return are accurately summarized by renowned author Christopher Hitchens who argues, "the Greeks have 'a natural right' to the sculptures, and they belong on the hill of the Acropolis." There are still those who oppose this argument like British Museum director Hartwig Fischer. He insists the Parthenon Marbles stay in London instead of being permanently loaned to Greece. Through careful deliberation of the arguments pertaining to this topic, returning the treasures of the Parthenon to the Acropolis Museum in Athens is clearly in the public interest. This way, reunited pieces of the Parthenon can properly be studied together and respected as pieces of cultural heritage. To further this finding, this poster will discuss the following topics: the Parthenon's historical significance and sculptures, the scandal surrounding the Elgin Marbles, arguments in favor of the sculptures being reunited in the Acropolis Museum in Athens, and the impact of Parthenon sculpture repatriation on the British Museum.

Avida Martinez and Luc Wu, *The Importance of Trade in the Ancient Mediterranean*

The Eastern Mediterranean in the Bronze Age has a lot to teach us about trade and human connections today. In the 13th century B.C.E., there were only three advanced civilizations in the world located in Mesoamerica, East Asia, and the Eastern Mediterranean. The Eastern Mediterranean has left plenty of written and cultural material for us to study. The Minoans on Crete were known for their luxury goods such as pottery and jewelry. Specifically, their Kamares Ware, which is the focus of our study, was distributed across the Mediterranean. Trade facilitated the blossoming of social relationships between different cultures alongside the spread of religion, language, architecture, literature, science, and customs. Based on the works of Bronze Age specialists, a specialist in Aegean history, and other experts; we will be focusing on the trade relationship between the Minoans and Egyptians, and how it shows an open relationship between

civilizations can spread different ideas. Kamares Ware was so highly liked by the Egyptians that they created imitations of their own. This evidence shows that the Minoans had a great influence on the Egyptians, and they also had a shared taste in luxury goods. In addition, the evidence of the lack of fortification in Crete shows that they were considered a peaceful state, and the Egyptians likely had no desire to conquer Crete. Through further analysis of the spread of Kamares Ware, we can gain a better understanding of human connections and our current trade relationships through the earliest recorded civilizations.

Carolyn Nguyen, Rachel Devlin, Vincent Zhang, Nick Molzon, and Ricky Phan, *Compostable Food Packaging Alternatives*

The world produces over 300 million tons of plastic material annually, half of which is single use plastic. These plastics can take up to a thousand years to decompose, making it overused, unsustainable, and damaging to our ecosystem. Bioplastics offer an environmentally conscious alternative. Our research was primarily dedicated to investigating the biodegradability and water resistivity of various compostable bioplastics currently on the market or being developed. Three different compostable bags were compared and tested for biodegradability and water vapor transmission rate: BioBag, Fuyah, Minima, and a control bag from a local grocery store. Biodegradability was measured through finding the amount of carbon dioxide that was released over 10 weeks due to degrading plastic. This was done through titrating potassium hydroxide with hydrochloric acid and calculating the carbon dioxide that had been produced. The bioplastics were also tested for water vapor permeability by finding the water vapor transmission rate by using the wet cup method. This method involves using the sample as a membrane and calculating the amount of water that can pass through it over a given amount of time. The results indicated that the most biodegradable and least permeable to water vapor were BioBag and Minima compostable bags, respectively. To compete against traditional plastics, bioplastics need to be further developed to be more versatile, have stronger barriers to ensure water resistance, and have a comparable shelf life. The research conducted helps us assess where we stand in the development of alternative materials for plastics.

Kate Lyn Nordstrand and Luc Wu, Flygskam, *Climate Change, Consumers, and Corporations*

Since the ratification of the Paris Agreement (2016), corporations and consumers have become increasingly aware of their carbon footprint. Global carbon dioxide emissions continue to rise due to the burning of fossil fuels, where 2% is from the aviation industry.

As the industry continues to grow, the Paris Agreement calls for a 45% decrease in global CO2 emissions by 2030 (compared to 2010-levels) and CO2 neutrality by 2050 to avoid surpassing the 1.5°C global warming threshold. In 2017, a movement aiming to change the norm of flying called “flygskam” (flight shame) emerged in Sweden. What is the phenomenon of flight shame? Can it be used to affect how corporations and consumers operate, and can it contribute to reaching the climate change mitigation goals set by the Paris agreement? By reviewing and analyzing climate reports from various corporations, academic journals on conservation behavior, and news articles, the project highlights that aviation has been affected by climate awareness. Consequently, airlines are promoting sustainability plans, more fuel efficient aircrafts, and biofuels. When it comes to motivating behavior change, shame was not considered a viable tool, since its effects may vary. However, social components play a key part in incentivizing behavior change. Studies show that publicly releasing ratings on individuals' energy conservation performance and giving information on how energy production directly affects public-health yields higher motivation for conservation. Future research should be conducted to investigate whether flight shame will continue to affect travelers and if technological innovations can help mitigate growing aviation emissions.

Clara Passos Xavier Alonso, *How Graphic Design Played an Important Part on World War II*

Propaganda plays an important role in influencing people's beliefs and behaviors. In wartime, that usually means getting them to fight or to support the fight (Phillip). Without the support of the public the war fronts become fragile, turning the nation into an easy target for enemies. Ever since WWI, propaganda posters skyrocketed in usage due to low cost, easy production, and overall effectiveness that it brought to the war effort. By collecting information from books and academic articles, this literary research project shows how graphic design was important for both the Allied and the Axis powers. I narrowed three recurring poster themes used on both sides: demonization of the enemy, rallying troops to the battlefield, and establishing a national war effort. I also analyzed how graphic designers used color, type, and other graphic elements to compose their artwork, which enhanced the theme, making it more effective. From there I traced a comparison to how graphic designers still apply similar techniques in contemporary work like advertisements, political propaganda, and activist posters. Graphic design is not just about aesthetics, but also influencing the public. This field of study has played and still plays an important influential role in our society.

Maggie Polite, *Glycolic Acid in Skincare*

Skin concerns such as fine lines and premature aging are fairly common problems faced by the average person. The purpose of this research project is to explore how glycolic acid can treat these troubles on both a microscopic and visual level. Glycolic acid is a member of the alpha- hydroxy acid family, it is the molecularly smallest of the group meaning it can penetrate deeper into the skin than the rest. Emerging studies show that glycolic acid may be able to aid in the slowing of the aging of skin due to prolonged sun exposure and increased age. As one ages, fibroblasts, the cells responsible for indirect collagen production naturally slow down, leading to a decrease in collagen production; sun exposure also damages collagen which leads to premature aging. Collagen is an important factor in our skin, it provides resistance to stretching so without enough of this structural protein the skin loses elasticity. In one study, human dermal fibroblasts were treated with different concentrations of glycolic acid for 24 hours. Results showed fibroblasts multiplying by a factor of 1.4 as well as a significant increase in collagen production. Since glycolic acid is relatively small it is thought that it can penetrate the skin deep enough to reach the layer where fibroblasts reside, therefore being an effective skincare product used to fight premature aging. Glycolic acid in skin care has not been thoroughly documented, further research is needed to identify how glycolic acid controls fibroblast proliferation and collagen production.

Rosario Reyes, *Kinetic Acoustical Ceiling Systems in Open Multipurpose Spaces*

Open spaces have become a popular trend in commercial, office, and residential planning, allowing individuals to more effectively engage with each other and the tasks at hand. While the high cost of construction limits the likelihood of building or renovating new rooms for specific functions, an open space can be utilized for different purposes. Various forms of activity in open spaces often contributes to a distracting environment and presents a major challenge in mitigating users' stress levels and lack of focus. This research aims to create a possible solution to the acoustical problems of less bounded areas in a kinetic ceiling design. In the initial stage of the research, sound-absorptive materials were tested separately from sound-reflective materials within a controlled environment. Different forms and combinations of materials were examined by measuring the properties of sound based on its intended use: presentation mode (sound is emitted from one or more spots) and study/test mode (sound is minimized throughout the volume of the space), or a combination of the two. The findings will be applied to a mechanical system in

a reception area of a library, morphing to the intended mode and purpose while also mitigating sound transfer throughout the rest of the library. It provides the means to optimize the function of an open area while increasing individual focus and keeping stress at a minimum.

Santiago Rivera, *"The Understanding of an Empty Room"*, A *Choreographic Study on Human Relationships*

Choreographers bring awareness to many topics we find important by creating dances that investigate issues relevant to our personal lives. My research will shed light on the experience of vulnerability and the way it affects our relationships. I will study five specific relationships that have affected me personally. The relationships I will explore are those with family, friends, strangers, lovers, and religion. The choreography includes a cast of 2 dancers who will perform this original work in five sections. Each section will portray one of the five relationships listed above. The choreography will be informed by personal experiences shared between the cast and choreographer. My intention is to create movement that will allow the audience to consider their own experiences, but to see them from an outside perspective. "The Understanding of an Empty Room" will be danced in five sections:

1. *The Innocence of Strangers* - A discovery on meeting people for the first time (Duet)
2. *The Heart Wants What It Wants* - An insight on the effects of how one deals with a failed romantic relationship (Solo)
3. *The Clothes You Gave Me, I Wore as a Shield* - An exploration of the mother-child relationship (Duet)
4. *The Kindest Heart* - A look into what is wanted in a healthy friendship (Solo)
5. *The Cries of a Heartbeat* - The relationship between oneself and a higher power (Duet)

The creation of this choreography examines the significance and power of human connection. Through the process of sharing our personal stories our intention is to present universal experiences.

Cheyenne Sherrill, *Gravitationally Lensed Galaxy Analysis*

Observations from the Hubble Space Telescope (HST), Atacama Large Millimeter Array (ALMA), and Keck telescopes are used to measure the light from Cosmos01. Gravitational lensing is the bending of light around an object that is high in mass, as predicted by General Relativity. The gravity of the foreground galaxy acts as a magnifying glass for Cosmos01, distributing its light into a ring around the foreground galaxy. Galaxies emit

various wavelengths of light which correlate to different physical properties of each galaxy (gas, stars, dust etc.). By measuring this light, we can quantify the physical properties of Cosmos01. In order to accurately measure the light emitted from Cosmos01 we modelled the light from the foreground galaxy in order to remove it. To do this we used two programs: Source Extractor and Galfit. Source Extractor measured the light and shape of the foreground galaxy while Galfit used the model to remove the foreground galaxy, leaving the observable light from Cosmos01. The resulting data was put into the Multi-wavelength Analysis of Galaxy Physical Properties program (MAGPHYS). MAGPHYS measured the spectrum of energy that is distributed throughout Cosmos01 and compared it with known galaxies. From this information we were able to detect a Star Formation Rate (SFR) of $2.3E+01M_{\odot}$, and total mass, (M^*) of $1.5E+11M_{\odot}$, (M_{\odot} read as "Solar Mass"). The next step is to create a plot using PlotDigitizer to compare SFR and Stellar Mass. This will help determine where Cosmos01 falls in relation to Star-bursting galaxies.

Mairead Staunton, *The Significance of Nostalgia in Irish Music*

Mentor: Eliza Rubenstein

Irish music conveys the nostalgia and homesickness of a people separated and forced out of their homeland, but in a method that joins those people together across seas, borders, and generations. The potato famine of 1845 forced many families to emigrate and start a new life. They left behind loved ones, their childhood homes, and their culture. The website *Library of Congress* estimates "that as many as 4.5 million Irish arrived in America between 1820 and 1930." Thus, began the music known as Caoineadh: a music of lament for the dead and longing for a country left behind. Irish music only grew from there. The music typically known as Irish Trad or Irish Folk music expanded the Irish music scene and its popularity. As recording technology became more readily available, the music gained similarity between performers in Ireland and America. The stark reality: the island was a bleak place to live throughout most of the 19th century. Nevertheless, the songs encapsulate a vision of the country through rose-colored lenses, an Ireland of beauty and tradition. A crucial element of Irish tunes is the way they bring people together. These standards are meant to be sung, danced, and felt collectively. Through interactive performance and presentation of significant Irish music, I will demonstrate the history and nostalgia of the people it represents. The dreams of the Irish are communicated and kept alive through the music of the culture, and its enduring popularity throughout the years.

Robert Stell, *Neurophysiological Correlates in Narcissistic Personality Disordered Individuals*

Recent studies on patients diagnosed with narcissistic personality disorder have demonstrated that a correlation may exist between a region of the brain called the left anterior insula and a propensity towards narcissistic tendencies. Ultimately this is a highly controversial subject, and the behaviors of narcissistic personality disordered individuals are extremely toxic, dangerous, and counterproductive to sustainable human progression. Given the elusive nature of this toxic disorder, professionals in psychology have a difficult time in diagnosing NPD, as the DSM-5 is woefully inadequate with respects to criteria for diagnosis of narcissistic personality disordered individuals. I propose that in some of the most toxic individuals suffering from this disorder exists a neurophysiological correlation. If there were a way to determine if individuals suffer from narcissistic personality disorder by way of analyzing high resolution brain imaging, then the implications would be groundbreaking for possible future technologies. These narcissistic personality disordered individuals exist on a spectrum, but a commonality between all narcissistic personality disordered individuals is that they are pathologically inclined to lie about their behaviors. Hypothetically, if one could apply software analysis of brain imagery at the time of interview for a government positions, leadership roles, or any professional occupations, the benefits would be innumerable. Nonetheless I will support my case against narcissistic personality disordered individuals in some detail, although the astonishingly negative effects of these individuals has been very well documented already. Is it possible to use neurophysiological correlation to determine narcissistic personality disorder in individuals by utilizing software analysis of brain imagery? I think it is quite possible, but more than just that, I think it is absolutely necessary for our sustained survival as a species on Earth.

Nolan Thompson, *Machiavelli: The Prince*

Niccolo Machiavelli's *The Prince* is a work that justifies extreme violence, including mass murder. It is also considered one of the modern starting points for political science. These facts are emblematic of a controversy that has existed amongst political analysis for centuries; is the work bluntly telling the truth about politics in an "amoral" fashion, or is the work an attempt to promote violence? Does the work's violent content serve a greater good, or does it represent a manual for how to do evil and promote self-interest? To answer this question, I will be putting my own textual analysis of *The Prince* in conversation with research from political scientists Harvey Mansfield and Leo Strauss, amongst others. My work will conclude that *The Prince* is

not satirical, ruthless, or cynical, rather a formidable modernistic guide for politicians and rulers of the time, yet still applicable due to the consistent violent nature of world politics.

Celine Tran, *Western Beauty Standards and Asian American Women*

In modern society, beauty standards play a large role in people's everyday lives. Digital media experts estimate that most Americans are exposed to 4,000 to 10,000 advertisements a day (Marshall). The bombardment of advertisements that often showcase Caucasian beauty ideals, however, has a negative impact on Asian American women. Most Asian American women value the ideals of Western beauty, leading to eating disorders, want for cosmetic surgeries, low self-esteem, and just an overall poor body image (Kaw). These insecurities feed into the 532 billion dollar beauty industry. The issue lies largely in the fact that Asian American women are comparing themselves and conforming to beauty standards that other races are more genetically predisposed to having. Studies have shown that Asian Americans are more likely to negatively self-evaluate themselves against these arguably unachievable ideals (Evans et al.). This paper will detail how Western Beauty standards lower the self esteem of Asian American women. This is done through literature review and collection of original data through an online survey. The survey was conducted to collect data that is more recent to in order to reflect more current effects. The survey showed that self esteem dropped after seeing the images of the models. The average Asian female felt below a 3 out of a scale of 5 about themselves, 5 being strong positive feelings. The average female felt that they were just a little above a 3 out of 5 in terms of how close they are to their ideal self, 5 being the ideal. It is important to make the negative impacts of Western Beauty standards more known so that Asian American women can feel more confident in and accepted for how they look.

Damian Valenzuela, *Mass Incarceration of African-Americans throughout History in the United States*

This study will examine and present an in-depth analysis of the causes and effects of mass incarceration of minority groups in the United States, particularly, African-Americans. I will present the trends in History afflicting African-Americans in conjunction with the prison system since the end of the Civil War in 1865, beginning with the ratification of the 13th Amendment. According to the NAACP (National Organization for the Advancement of Colored People), African Americans and Hispanics make up approximately 32 percent of the U.S. population, however they comprised 56 percent of all incarcerated people in 2015. This is

largely due in part to Institutional Racism (also known as Systemic Racism) rooted deeply within the United States Legislature throughout History from Black Codes to Jim Crow- the “War On Drugs” and privatized prisons. The research, statistics and analysis gathered for this study have been obtained from government databases, monographs and film documentaries. I firmly believe that in better understanding and teaching of our Country’s History, we can solve and overcome many issues present and relevant today with the oppression of African-Americans and minority groups in the United States. These issues include mass incarceration, unemployment, involuntary servitude, and disenfranchisement, amongst others. In addition, the end result of this study is to illustrate and change the discrepancy in investments toward prisons and correctional facilities from investments toward education and job employment programs after serving time in prison along with the dismantling of privatized prisons. For minority groups such as African-Americans to thrive in a society where History is proven to be against them, we must allow equal and fair opportunities to assist them, much of what we have been fighting for since the Civil Rights movement.

Emily Vandercook, *Sustainable Packaging Using Mycelium*
Expanded polystyrene (EPS), or more commonly known as styrofoam, can take at least 500 years to decompose and our use for it ends the minute we open our online package. Every year, styrofoam contributes to landfill waste, harms the water ecosystems, has limited reusability, and less than one percent is recycled. In the United States alone, approximately 570,000 tons of styrofoam is produced each year for packaging purposes. My research covered the effects of EPS on the environment and eco-friendly alternatives, in particular, forms of mycelium that feed on agricultural byproducts. For my research, I used academic databases such as *Science*, *Nature*, *GreenFile*, and *Science Direct*. Regarding methodology, research indicates that the mechanical properties of the composite and the intermolecular forces between mycelium and the substrate vary due to the fungus species and the type of agricultural waste used. One study used cotton gin waste and wood fiber fillers as the substrate for the mycelium to grow on. Although there were different levels of success with various mycelium and substrates used, there was a general agreement among scientists that the use of mycelium composites is more environmentally sustainable than EPS. Mycelium composites have other practical applications besides packaging including protection for buoys, thermal and acoustic insulators, and even cosmetics. Overall, I found that the mycelium composites’ benefits outweigh the negatives compared to

EPS. Hopefully, as the knowledge of this relatively new discovery continues to grow and gain support, we will see a positive impact on our planet.

Richie Vu, *Does Spatial Mapping Technology Match Up to Human Recognition Ability?*

With the prominence of autonomous vehicles, the technology utilized to sense and map the world around us has become especially important. This research project aims to answer whether spatial mapping technology today can match the ability of human driven recognition. The main ways that self-driving cars sense the world around itself were individually researched through existing sources including Nvidia and the National Ocean Service in order to better understand their abilities and how they're applied. In addition, a facial recognition software based on OpenCV (open source computer vision) was developed in order to compare to human recognition. The research found that the spatial mapping methods (primarily laser range finders (LiDAR), radars, and cameras) outperforms human ability due to the higher volume and accuracy of information it is able to obtain like accurate depth readings. However, for recognition of details that require interpretation like road signs and pedestrians, human driven recognition outperformed the computer driven vision in adaptability. This was supported by the facial recognition software's inability to distinguish 2d images of faces from real human faces and being affected by changes in the environment. Human participants, on the other hand, were able to adapt to these obstacles with greater accuracy. Because of this, the research concluded that the spatial mapping technology's weakness, in comparison to human recognition, lies in its adaptability and that this can be improved by enabling computer systems to reason like humans through artificial intelligence learning. This applies not only in autonomous vehicles but also in the areas of surgery, disaster relief, and space travel where systems modeling human recognition are extremely important in identifying essential details like persons in need of help in a disaster relief scenario.

Shideh Zokaïy, *Society's Criminals: The Homeless*

As homelessness rates increase in California, so does prejudice placed against them, which is shown through the making of biased laws that are systematically placed to arrest the homeless. My research question, framed by works of four different literary analysis, is, "How do the laws of homelessness in California reflect or change over time based on society's views, is there any correlation between the two?". My hypothesis is that laws continue to discriminate against the homeless throughout time.

My method of analysis of four different laws and arresting trends is a comparative setting and historical analysis of the frequency and types of laws placed in California to criminalize and dehumanize the homeless. The four most popular laws in California include daytime activities, nighttime activities, begging and panhandling, and food sharing with the homeless. Through analysis of these laws, I found that stricter laws and arrests are increasing, this displays public anxiety on homeless people despite the return from the economic recession (Berkley law). Also, California's cities have a high number and a wide range of anti-homeless laws increasingly enacted in recent decades. The data reveal law enforcement is significantly less likely to punish society's "ordinary" civilians and much more likely to arrest people based on crimes largely committed by the homeless population. In conclusion, in order to avoid contributing to a cycle of discrimination innately based on the homeless, this information should be used to work with social services and as individuals to better communities by voting to change laws.

About the donor:

Giles T. Brown and his wife, Beth, were founding members of the faculty at OCC and met here at the college. Giles left OCC in 1959 to become a faculty member at Cal State Fullerton and eventually became the Dean of Graduate Studies.

Giles T. Brown's gift to the college funds programs and activities that benefit instruction. The Forum Theater also bears his name.

