Giles T. Brown Student Project and Research Symposium

March 15, 2019

Thank you

Deans Michael Sutliff and Tara Giblin (currently Interim Vice President of Instruction) conceived of this wonderful opportunity for our students in early 2016, and we thank them for guiding us all through to see it to fruition over the years.

Committee chairs Duy Pham and Rachel Ridnor took the lead on many of the logistics for today.

The 2019 Symposium Committee members are Dean Abernathy, Shazia Aziz, Brittni Doty, Kelli Elliott, Robert Ellis, Jerome Fang, Twin Fernandez, Ulrike Green, Amy Hellman, Makenna Henry, Hannah Kang, Jon Mochizuki, Brent Rudmann, and Guido Sendowsky.

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 Horticulture Department for the use of their beautiful space for student posters & exhibitions of work and the Symposium luncheon & awards ceremony.

We would also like to thank Kevin Ballinger, Interim President of Orange Coast College, for supporting the research symposium and for volunteering many of today's awards.

Finally, we extend a huge thank you to the motivated and dedicated student presenters and faculty mentors who made today possible! Congratulations on your work and we appreciate you sharing it with the campus community.

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Keynote Speaker

Location: MBCC 162

9:30am-9:45am

Presenter: Michael Sutliff
Dean, Kinesiology & Athletics

Posters and Exhibitions of Work

Location: Horticulture Garden

10:00am-10:50am Presenters and Reviewers only
11:00am-12:00pm Presenters and General Public

Posters

Thomas Amick, *Designing a planetary gear speed reduction for a bench top metal lathe*
Mentor: Angelo Esposito

Caitlin Bates, *Mantle Xenoliths of the Mojave Desert*
Mentor: Dr. E. Erik Bender

Andrea Cilliani-Mineau, *Differential cross sections from elastic electron scattering in H2O*
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Nicolas Gravley, *Reproductive and morphological differences across Joshua tree populations*
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Matthew Hernandez, *Parenting Styles and Child Outcome*
Mentor: Masako Ura

Maher Hussein, *Homemade Solar Cell Efficiency*
Mentor: Taylor Fry

Olivia Jäggi, *A Comparative Study on Suicide Prevention*
Mentor: Ulrike Green

Josh Lewis, *Auditory Manipulation and Recollection*
Mentor: Masako Ura

Veronica Mayfield, *The Influence of Music on Cognitive Performance*
Mentor: Masako Ura

Ali Mohamed, *The Power of First Impression*
Mentor: Masako Ura

Yusuf Peker and Raymond Bakan, *Plaza built by water bubbles*
Mentor: Dean Abernathy

Joanna Sanchez, *Perception of Body Image*
Mentor: Masako Ura

Samuel P Satin, *Bike Yard*
Mentor: Dean Abernathy

Brittney Yore, *The Effects of Improved Nutrition in Captive Elasmobranchs at the 'Dennis Kelly OCC' Aquarium*
Mentors: Robert Ellis and Lindsey Williamson

Exhibitions of Work

Amoure Lamonica, *Kick Off Your Boots and Stay Awhile*
Mentor: Angela Plunket

Tram Nguyen and Colby LaBounty, *World Peace Project.*
Mentor: Vida Shajie

Daniel Yos, Owen Osborne, and James Davis, *Recreating the Classic Film Camera for the Modern Age*
Mentors: Angelo Esposito and Arnold Guerra

Oral Presentations

Location: MBCC 205, 206, 207, 208

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

Session 1: 10:00am-11:00am

1 - A MBCC 205

Noah Anthony Sharpe, *Rate of CO_2 absorption by sea palm*
Mentors: Karen Baker and Robert Ellis

Laura Minor, *The Light We Cannot See: Variation of Biofluorescence and Coloration of Captive* Condylactis gigantea *Anemone*
Mentor: Robert Ellis

Jonathan Sorensen, *Comparison of the Growth of Radish and Carrots in Aquaponics and Soil*
Mentor: Robert Ellis

1 - B MBCC 206

Nabiha Hasan, *Silence of the Lands: The Ecological Destruction of Post-War Iraq*
Mentor: Kelli Elliott

Carlos Mogrovejo, *Analyzing the Manifestos of Shooters*
Mentor: Rachel Ridnor

Mario Garrido, *The development and use of the Trebuchet as a weapon of war*
Mentor: Brent Rudmann

1 - C MBCC 207

William Jamieson, *Predicting the Collapse: Using Economic Data of the Weimar Republic to Predict the Future of America's Economy*
Mentor: Brent Rudmann

Alice Dang, *Residential Segregation and the Effect on Education of High School Students in the Newport-Mesa School District*
Mentors: Rachel Ridnor and Jordan Stanton

Hannah Hanson, *The White Tiger's Inspection of India: How Entrepreneurship, Society, & the Government Plague Poverty*
Mentor: Andy Stuart

1 - D MBCC 208

Mariangeles Pérez, *Building Mathematical Intuition with Extended Function Notation*
Mentors: Neil Godfrey and Dr. William Ziemer

Bethany Yates, *Culturing of Phytoplankton to Establish an On-going Live Foods Program*
Mentor: Lindsey Williamson

Cheyenne Sherrill, *Measuring the light from Cosmos01, a gravitationally lensed galaxy, in order to study the physical properties of distant galaxies.*
Mentor: Nicholas Timmons

Session 2: 11:00am-12:00pm

2 – A MBCC 205

Tegan Roberts, *Recent women's movements as rites of intensification*
Mentor: Ulrike Green

Fiona Evans, *Society's Influence on the Abandonment of Identity: A literary exploration of The Bell Jar*
Mentor: Laura Wagner

Read Hersh, *Reasoning Within the Mystery*
Mentor: Dr. Jerome Fang

2 – B MBCC 206

Spencer Finkbeiner and Tyler Bret, *Debunking the myths battle of thermoplyae*
Mentor: Brent Rudmann

Maher Hussein, *The travels of Ibn Battuta.*
Mentor: Brent Rudmann

Brandi Mahnken, *Alcestis Revived*
Mentors: Angela Plunkett and Irini Rickerson

2 – C MBCC 207

Valerie Fernandez, Ashara Demarest, Bryan Ly, Isabelle Phan, Karen Tax, and Sofia Aguirre, *A Holistic Approach to Alternative Therapies for Alzheimer's Disease Patients.*
Mentor: Robert Castaño

Matt Morton, *How Deforestation Negatively Affects Local Climates*
Mentor: Ulrike Green

Lana Jones and Tara Jones, *Impacts of Mesopotamia weather on humankind*
Mentor: Brent Rudmann

2 - D MBCC 208

Syed Zia Hussain, *Walkability*
Mentor: Dean Abernathy

Brea Browne, *Conspiracies: Who? * Why?*
Mentor: Brent Rudmann

Trent Stradley, *Proposal for Public Artwork on Campus*
Mentor: Tyler Stallings

Lunch

Location: Horticulture Garden

12:15pm-1:45pm

Students and family, faculty mentors, presentation evaluators, and Symposium committee members and supporters

Presentation of Awards

Location: Horticulture Garden

1:45pm-3:00pm

Abstracts **(listed alphabetically by student)**

Thomas Amick, *Designing a planetary gear speed reduction for a bench top metal lathe.*

Engine Lathes are machines used in part production, usually for helical or concentric surfaces such as found on screw or car axles. Full sized engine lathes can do many things the hobby sized versions can't, including run much slower. Making the lathe turn slower is useful when machining large diameters, and when threading small parts. If you attempt to thread a small part at too high a speed you don't have enough time to react to make the part with precision. To slow the lathe down the spindle pulley can be replaced with a pulley that has a planetary gear system inside it. This pulley and planetary gear will be designed specifically for the Jet 9x20 lathe. The design of this gear system is constrained by the surrounding components and the mechanical requirements of the gear system, while still trying to maximize the gear reduction achieved. Usage of the planetary gear system is further limited by not allowing a change in the rotations direction. ISO Standard module 0.8 gears were used to achieve a 2.61 gear reduction while fitting within the available space. The introduction of a planetary gear not only gives a lower minimum speed but also increases the number of available speed settings. By using planetary gears in this way we can increase the capabilities of home and hobby machinists for a much lower price than a larger lathe with comparable functionality.

Amoure Lamonica, *Kick Off Your Boots And Stay Awhile.*

Completed in 2018 using a black ink stippling technique
As an artist I'm in love with the dreamers, insightful thinkers, and innovators of the world.
It's such a beautiful thing to see a simple thought, blossom into a stunning creation. With lots of thoughtfulness, time, and a little patience It's easy to surprise myself as my artwork continues to evolve. This is why I have a great love and appreciation for the stippling technique.
This artistic piece is dedicated to those who would like to take a moment out of time and artlessly think about the "What If" ideas floating around in our minds. So I implore you...
Come daydream with me and 'Kick Off Your Boots And Stay Awhile!'

Caitlin Bates, *Mantle Xenoliths of the Mojave Desert.* Nineteen samples of mantle xenoliths were collected to better understand the nature of the uppermost mantle beneath the central Mojave Desert of California. Samples were collected from within host rocks that included both basaltic lava flows and cored bombs from two Quaternary volcanic centers at Dish Hill (Siberia Crater) near Ludlow, California and the Cima Volcanic Field near Baker, California. The distinctive macroscopic feature of the Dish Hill xenoliths is their coarse grain size with average grain sizes of 0.5-1.5 mm in collected samples. The variety, compositional changes, and possible sources of the core materials were analyzed. Xenoliths are highly variable in nature, consisting mainly of lherzolite, with subequal amounts of olivine and both ortho- and clinopyroxene with subordinate spinel. Other minor amounts of upper lithospheric xenoliths consist of fused granite fragments. Lesser quantities of both olivine and spinel xenocrysts are the found throughout the area. The generally accepted hypothesis is that these dominant lithologies, such as the lherzolites, are accidental inclusions derived from a surprisingly heterogeneous upper mantle. The variable mineralogy and geochemistry of these xenoliths appears to largely reflect differences due to metasomatism. Further petrologic and geochemical studies of both the xenoliths and the host rocks will reveal the specific nature of these xenoliths and provide constraints on the composition and nature of the upper mantle in the region.

Brea Browne, *Conspiracies: Who? * Why?*
Who believes in these theories? Why would one want to believe in such a theory? What does one have to gain when endorsing a conspiracy? Conspiracy theories have grabbed the attention of headlines throughout generations. Each era of culture has its own big controversial topic of their time. From the Baby Boomers ordeal that Neil Armstrong did indeed walk the moon, to Generation Z's Barack Obama Birther Conspiracy. People doubting what they have been told is nothing new, but I was curious to find out why they would want to reject or endorse such issues. To research this idea I created a twenty question survey, handed out to each of my classes at Orange Coast College (and the awesome Philosophy club), inquiring political orientation, generation, and opinion of listed conspiracies. I chose nine specific conspiracies, although my main focus was only on three. 1) If government officials were aware of the terrorists attacks that took place on September 11, 2001 before they happened; 2) If Barack Obama was born in the United States or not; 3) If the United States Government has researched the effects of LSD on unsuspecting American citizens. Of these three conspiracies 1 is most likely to be endorsed by Liberals, 2 is more likely to be endorsed by

Conservatives, and 3 is not a conspiracy at all, but an actual proven event that did take place. Through the information I have gathered, I will prove that not only do people doubt what they hear, but they will endorse or reject things based on their own personal/political beliefs.

Andrea Cilliani-Mineau, *Differential cross sections from elastic electron scattering in H2O.* This experiment sought to resolve some skepticism based on previously-released differential cross sections (DCSs) from elastic electron scattering for water. Since water's dipole moment causes uncertainty in its gas diameter, which may have resulted in the discrepancy between the DCSs, this experiment also sought to establish a relationship between the differential cross section and gas diameter. A crossed beam electron spectrometer with a resolution of 150 meV took measurements of elastic scattering at 20 eV, 25 eV, 30 eV, and 50 eV for angles from 15°– 119°. DCSs are presented for these angular and energy ranges, as calculated using the Relative Flow Method. These DCSs are compared to theoretical values, calculated using the Schwinger Multi-Channel Method with Pseudopotentials, as well as other, accepted experimental values. Presented also, in order to determine the dependence of DCS on gas diameter, is a comparison of target to helium cross section ratios to various gas diameters. It was discovered that DCSs are not as sensitive to changes in gas diameter as some have previously assumed. As well, the gas diameters that have been assumed in previously-conducted experiments are incorrect, leading to lower-than-expected DCSs.

Alice Dang, *Residential Segregation and the Effect on Education of High School Students in the Newport-Mesa School District.* I will be gathering data on the residential segregation present throughout the cities of Costa Mesa and Newport Beach and how it has an impact on the quality of education. The high schools I will be researching are Corona del Mar and Estancia. Residential segregation is a significant social issue because it results in an unequal distribution of resources and less diversity. While these cities both are apart of the same school district, the schools receive different amounts of funding which contribute to the students' education and even success. Costa Mesa is a predominantly Latino community, with higher poverty rates and socioeconomic disadvantages. The students at Estancia perform poorly academically, with lower averages in test scores and lower admittance into colleges. Newport Beach is one of the most affluent cities in Orange County, and continues to remain predominantly white. The students at Corona del Mar have a higher rate of success and go on to a higher level of education.

Despite their closeness to each other, the cities are incredibly different. I will be gathering quantitative data through government websites, searching for the correlation in numbers between homeownership and educational success and comparing these results between the two cities. Furthermore, I will be gathering qualitative data through scholarly works and interviews, speaking with past students that went to these high schools and recounting their personal experiences. With the results from my research, I expect to find a great disparity among the experience of students between these two schools.

Fiona Evans, *Society's Influence on the Abandonment of Identity: A literary exploration of The Bell Jar*. Literature has an unparalleled ability to serve as a lens for examining the human condition; this unique quality acts as the driving force behind this research project's examination of the absence of identity found within The Bell Jar. Semi-autobiographical in nature, The Bell Jar (1961), written by American author Sylvia Plath, explores the concept of identity and its rejection from a woman's point of view. Esther, the novel's protagonist, faces an array of social expectations pertaining to gender roles, marriage, emotions, and societal value; it is by these expectations that Esther seeks escapism by separating herself from both her physical/emotional states. The term absence of identity used in this research is derived from Esther's apparent lack of identification with herself and the world around her. Plath evaluates the inherent human contradiction between a need for escapism and the pull towards finding connection within society. A close reading of this primary text, put into conversation with literary journals/criticisms, reveals how the concepts of gender, class, and culture influence identity. This research is not limited to importance in merely a literary sense; the ideas expanded on and formulated from the text demonstrate a relevant connection to the lives of people as a whole. Through observations presented about literature in the novel, this research strives to demonstrate the validity of literature itself as it pertains to expressing identity yet also its contrasting ability to act as an extension of society's hand in perpetuating expectations harmful to the formation of identity.

Valerie Fernandez, Ashara Demarest, Bryan Ly, Isabelle Phan, Karen Tax, and Sofia Aguirre, *A Holistic Approach to Alternative Therapies for Alzheimer's Disease Patients.* Alzheimer's disease (AD) is a progressive neurodegenerative disorder that presents with dementia. Due to the nature of the disease, no diagnosis is available until autopsy. Including medication, the only current form of treatment is symptomatic. Decades of research have yielded no new forms of therapy.

Development of alternative therapies have been hindered by several factors including: cause of the disease, efficacy, research methods, and inability to complete the research (funding & other factors). Use of technology in therapies have not been well documented. (Yiannopoulou and Papageorgiou, 2013). Difficulties implementing technology include: technical ability of researchers, creativity for deploying state-of-the-art technology and lack of cross discipline research teams.
Forming a cross discipline research team enables implementation of a wide variety of holistic methodologies used to identify creative approaches and discover new and effective therapies for patients and caretakers. This use of cross discipline research teams has vast implications for the scientific community.
To start, four research subject groups are formed: biology, cognition, chemistry, and technology. Each group presents a thorough literature review of available AD therapies pertaining to their subject. A form of therapy is suggested that may be revisited, adjusted or created. Time permitting, the new forms of therapy will be rated for effectiveness and producibility by patient caretakers, investors and other professionals.

Spencer Finkbeiner and Tyler Bret, *Debunking the myths battle of thermoplyae.* Hollywood is known for twisting historical events to fit the needs of making an exciting action movie. In addition, the directors always seem to sacrifice historical integrity in the process of making the movie. A good example is the popular 2006 movie titled 300. To explore the misconceptions of the movie about the battle of Thermopylae, our group first had to analyze the movie indiscriminately through a fine scope to compare the movie to past historical records. The movie portrayed the Spartans essentially fighting naked which cannot be farther from the truth. In a interview with Evan Sanders, a AP World History teacher who had a specification in ancient Greek history, he described the Spartans as being a “heavy infantry” composed army with massive shields that would cover the majority of their body. There is a famous scene in the movie which showcases Leonidas kicking the messenger of Xerxes into a pit of death while screaming “THIS IS SPARTA”, but that event never happened as even Herodotus, a famous Greek historian, mentioned that Xerxes never sent a messenger to the Spartans because the warriors didn’t respect the motto of “don’t kill the messenger”. The fights scenes in the movie didn’t accurately portray how Spartans fought as it showed Spartans throwing their shields and breaking formation. The Spartans fought in a close group formation known as the “phalanx” and Spartans would never let go of their shields as even their mothers would say to them “come back with your shield- or on it”. Overall, there were many false details riddled

throughout the movie which is dangerous as the audience believes that it is accurately portraying the Spartans. Even though Hollywood should be held accountable for deliberately falsifying history, it's justified as their industry requires their movies to be entertaining while not being fully accurate. Most of the blame should be handed to the audience for not doing their own research. As the entertainment industry grows around the world, audiences have to take more responsibility in their own research about historical events and must actively question what is spoon fed to them by others. Our advice to audiences is to do your own thinking or someone is going to do it for you.

Mario Garrido, *The development and use of the Trebuchet as a weapon of war.* Sieged weapons played a significant in warfare from China, North Africa, and Western European among all the sieged weapons types developed around the world before and during the early middle ages, the largest and most feared was the trebuchet. In China, the most powerful trebuchet was pulled by 250-man crew, throwing stone shot weighing between 57 and 63 kilograms at a distances of 75 meters. Invention of the counterweight trebuchet a different version of the trebuchet was invented by the Europeans army in 1194. Sconed is "Tarsust's" trebuchet was a counterweight trebuchet operated by a single man, and had the power of 55 men used in at the siege of Castelnuovo Bocca d'Adda in Northern Italy in 1194 Invention of the counterweight trebuchet in addition, the Byzantine empire in the twelfth-century at the siege of Zevgminon in 1165. The Third type of trebuchet was the "hybrid trebuchet," used in the eighth-century to launch stone- shot, weighing 185 kilograms. Among these trebuchets there were legendary versions, such as the War-Wolf used to turn the tide of battle during the Scottish wars for independence, and, the famous Perregrinarm et Gesto Regis Ricardi, which was used by Acre's defenders against Henry of Champagne; in one example when The Normans used three counterweight trebuchets against Alexandria in late July of 1174, it destroyed three large cat-castles forcing Normans to withdraw after the three-day siege Invention of the counterweight trebuchet

Nicolas Gravley, *Reproductive and morphological differences across Joshua tree populations.* The Joshua tree (*Yucca brevifolia*) is one of the most iconic plants found in the Mojave Desert. Morphological differences within subspecies *Yucca brevifolia brevifolia* are examined through comparison of two unique populations: Lost Horse Valley in Joshua Tree National Park and Joshua Flat in the Inyo Mountains. The individuals present in the Inyo Mountains were proposed as a separate subspecies *Yucca*

brevifolia herbertii, however, this classification was not generally accepted (Lenz 2007). Clear differences in structure and growth patterns between both populations suggests a response to different environmental conditions. Understanding these differences will allow for a greater understanding of the way *Yucca brevifolia* will respond to changing environmental conditions. For this study, Joshua tree density was measured using randomly placed 25m2 quadrats across a range of elevations in each of the two populations. Approximate height, number of branches, number of flowers, and number of clones were noted for each individual within the plots.
Peak density elevation, average height, average number of branches, and average number of clones per individual were analyzed for each population and then the results were compared in order to determine differences. The population in Joshua Flat was found at a higher average elevation, were smaller with less branches, and exhibited higher rates of cloning than their counterparts in Joshua Tree National Park.
Data on Joshua tree population density and characteristics will be invaluable to future climate change research in the Mojave Desert. As rising global temperatures stress and destabilize populations, the response of *Yucca brevifolia* populations can provide information on how to best direct conservation efforts in the desert ecosystems.

Hannah Hanson, *The White Tiger's Inspection of India: How Entrepreneurship, Society, & the Government Plague Poverty.*
Socioeconomic and governmental influences shape the social structure of India. Aravind Adiga's The White Tiger uses the character Balram to explore the "Rooster Coop" that Indian society is trapped in. This argues India's social structure, and cultural constructs influence the rich and poor interactions through familial obligations of providing for the family. Throughout The White Tiger, Balram exposes the government's fallacies in his quest of entrepreneurship but falls into the same trap, becoming a carbon copy of his former master. The White Tiger argues against the unneeded deleterious violence projected in Balram's violence to refute Fanon's theory of violence freeing oppressed peoples.
This literature review expands beyond the novel, expressing the downfalls of India's democracy causing divides between socioeconomic classes. This investigation illustrates how the diseased Indian society plays a role in Balram's constructive violence (killing his master to escape the Rooster Coop). By broadening this review to literary research, it discusses how other scholars view Balram's violence such as through Fanon's violence theory. In the novel, Balram uses murder to be free which can be

seen influenced by post-colonialism, grappling with the issue of mimicking colonial oppression with violence.
Field studies connect this research to real-world disquisition about current India's issues surrounding its social and governmental structures. The research on India shows the negatives of migration linked to decreasing productivity in farming areas and higher poverty levels. The continual influence of modern ideologies has caused families, employers, and servants to treat each other with aggression as reflected in The White Tiger and India.

Nabiha Hasan, *Silence of the Lands: The Ecological Destruction of Post-War Iraq*. The Iraq War has caused much destruction in its wake, but one victim that often goes unnoticed is the environment itself and the balance that Iraq's natural systems creates in favor of its plants and animals. Although countless studies have been published that track the aftermaths of oil spills, burning of toxic trash, and sulfur oxide fires on the health of the Iraqi human population, this literature review will explore the effects of this environmental warfare on the biodiversity of the native plant and animal populations of Iraq, focusing on the birds and marshes of the country. The methodology began with searching six key phrases that comprised the topic: "biodiversity of Iraq", "environmental issues of Iraq", "environmental warfare of Iraq War", "effects of the Iraq War", "oil spills in Iraq", and "sulfur oxides in Iraq". The results indicate that the unnatural concentrations of various toxicants in Iraq's atmosphere and waterways has done unprecedented damage to its water and air quality. Older articles were reviewed to confirm the former state of Iraq's ecology before the war. Despite the lack of studies discussing the effects of the war on the biodiversity of Iraq, evidence suggests that the sulfur oxide fumes and trash toxicants being released into the atmosphere are causing a steady decrease in the population of Iraqi birds. Along with this, the pollutants in the Mesopotamian Marshes directly correlate to the extinction of several key plant and animal species. The damage done to Iraq is subtle, but its repercussions are most certainly not. By understanding the consequences of warfare on an environment, the next steps can be taken in its restoration and from preventing these atrocities from occurring again.

Matthew Hernandez, *Parenting Styles and Child Outcome.*
Americans' views toward those who identify as lesbian, gay, bisexual or transgender (LGBT) have changed substantially in recent years. However, young adults are still discouraged to disclose their sexual orientation, and negative social climate affects their health and well-being (Puszczyk & Czajeczny, 2017;

Steele, Daley, Curling, Gibson, & Green, 2017). Moreover, parents in the U.S. are still expected to raise children within traditional gender norms and disciple their children differently depending on their genders (Montgomer, Chaviano, Raybum, & McWey, 2017). The purpose of this study was to examine people's attitudes toward parenting styles and their effects on children. Twenty-one students from a psychology class at Orange Coast College read one vignette describing a boy growing up in a gender-neutral environment, and then read another vignette describing the same boy growing in a traditional environment. Then, the participants evaluated the child on his future academic and social competence. The result showed the child in the gender-neutral household was expected to show more positive outcomes than the child in the traditional household. Although the previous studies indicated negative societal attitudes towards sexual and gender diversity, the current study indicated that people tend to support children who explore their gender without restriction from society or the gender they were born with. It implies a social climate of greater acceptance of LGBT people and moving toward equality. However, the current study's limitations include the small sample size and a lack of generalization to other groups. Thus, it is important to replicate this study using a variety of people in different areas.

Read Hersh, *Reasoning Within the Mystery.* Scientific Reasoning has evolved due to advances in Science and Technology. Dark Matter and Dark Energy comprise 95% of the Universe, although scientists have yet to observe or even know for sure those entities exist. This shift in reasoning could be classified as Inference to the Best Explanation, an Inductive form of reasoning that applies to advanced theories in Physics and Cosmology. Dark Matter and Energy, Quantum Phenomena, Supersymmetry, and String Theory have yet to be 100% proven. Originally, the Scientific Method was developed in the 17th Century and some believe it needs to evolve as well. For example, Exoplanets were not directly observed at first. They were inferred to exist due to the oscillation of the stars they orbit. The significance of the research project is to highlight the fact that 95% of the Universe is something we know very little about and have not directly observed. Incredibly, the 5% (called Baryonic Matter) we know exists includes all Stars, Galaxies, Plasma, and Large Scale Structures (Cosmic Filaments and Domain Walls). There is much more to be discovered about the nature of the Universe.

Syed Zia Hussain, *Walkability*. According to Walkscore.com Costa Mesa with 109, 960 residents with area of 15.81 mi² has 62 walk score and bike score 64 While Davis with 65,622 residents residing in 9.919 mi² of land have a walk score of 45, and Bike score 90 and Santa Cruz with only 59,946 residents in the area of 15.83 mi²and area of in its city has 63 walk score and 84 bike score. Jeff Speck, a well-known American Urban designer, suggests four elements to encourage walkability; a reason to walk, safety, comfort and it interesting and when all these elements are offered simultaneously in order to encourage residents to walk to errands.
During the industrialization in America houses were moved away from the mills and the life span increased tremendously and since then suburban and sprawl design has been popular in America. Traditional urban design is the answer to encourage walking while Suburban design can be changed to traditional, Sprawl is very fixed. Costa Mesa is suburban.
The research explores the findings of Davis and Santa Cruz and related to the City of Costa Mesa. A survey is used to determine how encouraging is Costa Mesa to walking. Total of thirty survey are conducted in three different areas of Costa Mesa; 17th street, triangle Square and Harbor street. The focus of my research is to analyze how inviting is Costa Mesa infrastructure is for walking, and what changes or improvement could motive residents to walk in their city every day.

Maher Hussein, *Homemade Solar Cell Efficiency.* Testing the efficiency and practicality of homemade solar cells and their ability to sufficiently power small electronics. As people are becoming more conscious about the effects of non-renewable energy sources on the environment and their own individual impact, the efforts to provide and sustain renewable and emission free energy are at an all time high. Solar panels have become a common trend among households to decrease their carbon footprint as well as decrease their monthly electricity bill. While traditional panels are made from silicon, preliminary tests have been conducted on copper cells to test their efficiency. To determine whether or not creating a homemade solar cell is sufficient to power basic electronics such as phone chargers, light bulbs, or speakers, different types of metals will be compared based off their price and efficiency to determine which is the most appropriate for the homemade cell. With the selected metal, different systems will be compared against one another to determine which can produce the most voltage measured with a voltmeter. The variations of systems include different circuit structures, different solution ratios, and different coatings on the cell all to determine the most effective overall system. Once the

most efficient system is selected, numerous tests will be taken to conclude whether or not homemade solar cells are viable. With the creation of the system, one major consideration and goal is to maintain the common household accessibility of the materials used as well as the clear and practicality of assembling the system.

Maher Hussein, *The travels of Ibn Battuta.* When the title of "great traveler" is brought up, names such as Marco Polo, Christopher Columbus, and Zheng He arise but rarely do people hear about Ibn Battuta. Born into a well-off family in Morocco, Ibn Battuta spent the majority of his life traveling northern Africa and south Asia but is yet not known to the majority of people. Travelers begin their journeys for different reasons. In the case of Ibn Battuta, it was to perform the Muslim pilgrimage, Hajj. For Marco Polo however, it was to follow in the footsteps of his father and uncle. While at different times, the paths these travelers took overlaps at a timeframe narrow enough to provide an interesting comparison to how the different backgrounds of these two men influenced the storytelling they told of the places they visited. In this metanalysis, Ibn Battuta's scholarly background in Islam will be correlated to that of other travelers such as Marco Polo to measure its influence and accuracy pertaining to other historical knowledge known about the places they visited in comparison.

Olivia Jäggi, *A Comparative Study on Suicide Prevention.* Suicide is considered to be the tenth leading cause of death in the United States, and national suicide rates have increased an alarming 33% since 1999. To understand this trend, suicide rates from the United States were compared to those of South Korea, a country that is notorious for its high suicide rates. By examining relevant literature and comparing statistical data, it was found that in contrast to the United States, Korean suicide rates have decreased significantly over the last few years. This study will examine the potential reasons behind this trend and discuss the implications on suicide prevention in the United States.
In 2011, the Korean government issued a ban on paraquat pesticides during one of their national suicide prevention initiatives. This is significant because pesticide poisoning was one of the most common methods of suicide at the time. Shortly after this ban, Korean suicide rates began to decrease rapidly, which implies that the restricted access to lethal suicide methods might serve as an effective suicide prevention strategy. In comparison, firearms contribute to more than 50% of suicides in the United States, thereby making them the most common method of suicide. Considering the effects of Korea's ban on pesticides, it can be hypothesized that the restriction of access to firearms could

significantly decrease national suicide rates the United States. Although the restriction of firearms cannot solve the underlying problem, it would still serve as an important first step towards the improvement of suicide prevention overall.

William Jamieson, *Predicting the Collapse: Using Economic Data of the Weimar Republic to Predict the Future of America's Economy.* After the end of the Great War, Germany was plunged into economic turmoil marked by rapid inflation. When the German economy did recover in the mid-1920s it was not long before the Great Depression threw almost every nation on Earth into chaos. A similar story can be told almost a hundred years later when the Great Recession occurred the economies of First World nations suffered immensely. It was in 2009 when the American banks were bailed out that the economy began to slowly recover, however, the economic growth is not sustainable and it may lead to a disaster worse than the Great Depression.

Lana Jones and Tara Jones, *Impacts of Mesopotamia weather on humankind*. The weather conditions experienced by the people of Mesopotamia were characterized by three features; semi-arid weather, high temperature and low rainfall, an implication that there was a need for the people to result in activities that cater for a life without crop cultivation due to a shortage of rain and the dryness of the land. The use of water from rivers Tigris and the Euphrates for agriculture epitomizes the creativity of the people and their pursuit of crop cultivation despite the lack of enough rainfall for farming. Furthermore, crop cultivation relying on the rivers impacted on the settlements of the people of Mesopotamia as evident in human settlements along river banks. The impact of the weather does not only reflect in artificial irrigation and settlements along rivers, but also the pursuit of animal keeping such as pigs, sheep, cattle, and goats. Fundamentally, the people of Mesopotamia can be applauded for resulting in an alternative way of raising food and engaging in commercial activities through the production of wool, milk, and meat. Despite the dry weather and the shortage of rainfall, Mesopotamia was not short of inventions and discoveries. Notably, an agrarian invention, such as artificial irrigation, archaeological discoveries, use of religious leaders for treatment of diseases and illness as well as the establishment of modern civilization indicate the path and measures undertaken to bring a difference in the way of life and human experiences as well as activities among the people. Despite the emergence of modern civilization, there is still a similarity between old and modern Mesopotamians insofar as social classification and hierarchical structures are concerned.

Josh Lewis, *Auditory Manipulation and Recollection.* Many scholars have examined the different effects of music on learning and emotions. One study indicated that listening to classical music can increase cognitive performance (Wilson & Brown, 1997; Lummis et al., 2017), and another study suggested that listening music helps listeners to have pleasure feelings (Bhatara, Quintin, Fombonne, & Levitin, 2013). However, the previous studies did not examine different types of music such as rock music and did not test visual memory. The current study reexamined the effects of different types of music on cognitive performance among college students. We recruited 10 men and 11 women from one psychology class at Orange Coast College. The experiment was conducted in a lab setting. The participants were randomly assigned to conditions including silent, classical music, and rock music. And then, the multiple-choice questions were used to measure how much they recalled the pictures. Although the rock music group showed slightly better performance than the control and classical music groups, this result was not statistically significant, $F(2, 18) = 2.01$, $p > .05$. It is possible to conclude that the current study was insignificant because of the small sample size and the difficulty of the test. Thus, more research is needed to examine the effects of music on human behaviors. Future research should consider using more participants and more difficult tasks.

Brandi Mahnken, *Alcestis Revived*. The 5th century BC Greece was composed of tumultuous wars, the transfer from a tyranny to a pure democracy, and a massive intellectual and artistic movement. During this Classical Era, art and architecture thrived as the Athenians funded the movement to consolidate the power they held as the head of the Delian League. Greek theatre specifically benefited due to the rich being required to either supply a performance or taxes. Every year, citizens gathered to watch various performances in honor of the god Dionysus. As a skeptic and rationalist, the playwright Euripides was known to address more controversial issues in regards to the social life of Athenians in his plays, and used the theatrical performances as a vehicle of thought rather than just a form of entertainment. Due to his unorthodox and unsettling approach to theatre he was both renowned and ridiculed by the Athenians. Through the investigation of Alcestis and her sacrifice of life for her husband king Admetus, this presentation aims to examine Euripides position on self-excellence and personal duty. These themes are further investigated by linking the play to its artistic interpretations from different periods of art history. The comparison of Alcestis in its connotation in 5th century Athens

against its transition in art and modern understanding provides insight to the evolution of virtue as well as its applications today.

Veronica Mayfield, *The Influence of Music on Cognitive Performance.* Music has been studied extensively across a large body of research both as a distraction and as an enhancement to strengthen a person's cognitive performance. (e.g., Moore, Schaefer, Bastin, Roberts, & Overy, 2017; Reynolds, McClelland, & Furnham, 2014; Villareal, Brattico, Vase, Østergaard, & Vuust, 2012). The current study, particularly, examined whether music with positive emotion would influence a listeners' cognitive ability. Twenty-two students who enrolled in one psychology class at Orange Coast College were randomly assigned to one of three conditions, listening to music that expressed a positive emotion, music with negative emotion, and no music. Control elements used in the study include selecting music from the same film music composer. Students were asked to solve up to six maze puzzles increasing in difficulty within ninety seconds while listening to music, and no music. After the experiment was conducted, participants were asked to describe their experience including their familiarity with the music and puzzle difficulty. The three groups were compared based on the cognitive skills scores via a one-way ANOVA test. The results indicated that there was a significant effect of music on cognitive performance, $F(2,16) = 5.36$, $p < .05$. Specifically, Tukey post hoc comparisons suggested the mean score for the positive emotion condition ($M = 62$, $SD = 13.14$) was significantly different than the no music condition ($M = 34.57$, $SD = 12.84$). Interestingly, the negative emotion condition ($M = 42$, $SD = 19.72$) did not significantly differ from the positive emotion and no music condition. This indicates that the types of music influence cognitive performance. The present study yielded an additional piece of evidence supporting previous studies on the effect of music on strengthening cognitive ability. However, when comparing the results between positive and negative emotion expressed in the music, we found mixed results, suggesting that different emotion in music may affect different types of cognitive skills. Future research can consider a replication of the current study using different types of music, increase the length of music, and use a maze test with standardized grading rubrics.

Laura Minor, *The Light We Cannot See: Variation of Biofluorescence and Coloration of Captive* Condylactis gigantea *Anemone.* Biofluorescence is the ability of an organism to absorb and re-emit light wavelengths at different energy levels. In marine environments, this trait is commonly seen in photosynthetic organisms that glow when placed under a certain wavelength of light. To learn about how light availability plays a part in the

amount of biofluorescence, four *Condylactis gigantea* anemones were exposed to different lighting scenarios and observed over a two-month span. Under normal white light conditions, these organisms appeared a cream color. However, when exposed to blue light, and using a yellow light filter, their biofluorescence is able to be viewed, producing a lime green glow. As these anemones were placed in close proximity to a white light source, over time, they increased in the populations of zooxanthellae, microscopic photosynthesizers that live within other organisms. After a two-month test period, the presence of zooxanthellae changed their color from a cream color to an orange-brown color. When placed under the blue light conditions, their fluorescence had increased. This suggests that there is a correlation between the presence of zooxanthellae and the amount of biofluorescence. A higher concentration of zooxanthellae may be an indicator of health and ability to photosynthesize effectively. The biofluorescence associated with the zooxanthellae could therefore enhance the husbandry of anemones. Future studies could explore how the other aspects of coloration, such as the organism's body color, could alter the anemones' fluorescent ability. Further research of biofluorescence could also lead to a deeper understanding of the health of other photosynthetic organisms in the ocean and their ability to withstand bleaching events.

Carlos Mogrovejo, *Analyzing the Manifestos of Shooters.* There have been numerous shootings across the United States within the past 2 decades, yet only a small percent of the perpetrators have created manifestos to document their state of mind prior to the attacks. Through studying these manifestos and analyzing trends among them, there is hope that there will be a list of factors leading up to the shootings that tie them together. In studying manifestos from Dylann Roof, Seung Hui Cho, Elliot Rodger, Kyle Andrew Odom, and many more, there are clear links involving sex, social isolation, patriotism, racism, religion, political ideology, history, and mental illness. By studying each manifesto under a scoring chart, it was easy to link the characteristics found throughout them. After this was completed, I began researching more into the backgrounds of the individuals to receive a greater grasp of the links found. This research was enforced by their manifestos and helps to depict the mental state that they had prior to their shootings. As previously listed, many of the shooters had strong racist and patriotic ideologies. Research found that this was greatly influenced by previous personal and societal experiences, such as the Presidency of Barack Obama, the rise in the power of minorities, and the fear of losing power on American soil. These negative experiences, backed by a history of social

isolation and mental illness, often compelled the culprits to engage in such a behavior they felt would make them a martyr. As further research was conducted, many of these tragedies became one overall story of frightened individuals with a delusional goal to save the country from threats they felt had no other way of being addressed. Some of the shooters even named previous shooters as inspirations in their manifestos. The goal of this research project is to attempt to better understand underlying traits within previous shooters, to hopefully help predict future shootings, as well as to provide additional information as to how these could have possibly been prevented.

Ali Mohamed, *The Power of First Impression.*
Appearance judgment is not only for mating reasons in the case of humans. People tend to judge personality traits of individuals based on how they look, a theory that was suggested (e.g., Hüttner & Linden, 2017; Susanne-Marie & Linden, 2017; Wolffhechel & Fagertun, 2017). This study focused on how someone's appearance could shape one's impression and affect how much information could be retained from the person's speech. During this study, 18 students from one psychology class at Orange Coast College were randomly assigned into one of two groups. One group saw a picture of the man who dressed formally. The other group saw a picture of the man who dressed casually. And then, the participants listened to a short speech about himself and evaluated him in terms of his academic and career performance. The men in both pictures were identical. The results demonstrate that there was no significant difference between the group that was shown a picture of a well-dressed student and the group that had the casually dressed student. $t(16) = .69$, $p > .05$. Also, the participants were asked to recall the information from the speech. The current study hypothesized that the participants would pay more attention to the speech given by the person who dressed formally than the speech given by the person with a casual dress. The result also did not show a significant difference between two groups, $t(16) = .25$, $p > .05$. Although the current study's result was different from the previous studies, there are several factors that could lead to this result. The sample size can be the major element. Also, the participants did not see his facial expressions, which can be another major reason. Moreover, the participants were young college students, and the person in the picture was also a young college man. Thus, they may have shown favorable attitudes toward him regardless of his appearance.

Matt Morton, *How Deforestation Negatively Affects Local Climates.* Throughout history, innumerable civilizations have risen and fallen – both large and small alike, and for reasons not dissimilar. However, the cause of collapse for many an ancient and massive civilization often hold something in common; man-induced environmental changes. While climate change is a result of countless factors from man-made invention, a timeless cause-and-effect change comes from the issue of deforestation for sustainable mass agriculture. The question that will be explored is, what happens as a result of mass deforestation to a local environment? We have the answer to this currently, and it results in many negative factors to many important environments. Various factors that will be used as evidence are retreating ocean shorelines due to deforestation, decreasing soil carbon levels, and an increase in levels of mosquito-related illnesses and disease as well as all around climate warming, resulting in elongated droughts. For each of these factors I will present a civilization that has suffered from each of these items: The Mayans with an extended drought due to reflecting solar radiation after deforestation, ancient Rome and a rising mosquito infestation along with diseases due to mosquitos, and falling soil carbon levels in any area with deforestation. All items compiled in my research provide a very full view of the consequences of mass deforestation with each item on the above list have a cascading effect. With falling soil levels comes infertile crop yields, falling sea levels could result in higher temperatures and deforestation in drought ridden areas allows for higher reflection of solar radiation, only extending these droughts. While some of these items did not lead to the fall of civilizations, collectively can have disastrous effects. The sources I've found as well as some ongoing research have shown me that these are not case-by-case, but truly can be translated from one environment, one era of history, to another. Conclusively, I believe that deforestation on a mass scale – be it for urbanization or for agriculture (although each could derive their own set of consequences) can and will result in devastating long term and short term effects on a local environment.

Tram Nguyen and Colby LaBounty, *World Peace Project.* This is a collaborative, meaningful piece of artwork from all of the members of the Appreciation of the Arts Club and the EOPS Honors Club as well as many other students on campus who have agreed to be a part of this project anonymously on OCC's Multicultural Day. The artwork started from an entirely blank canvas. Our members started by drawing a simple globe in the middle. We then asked students walking by to paint anything that represents world peace to them. The end result is a canvas

covered in colorful peace signs, images of people of all colors holding hands, and even hand-written messages of love and peace in a myriad of languages. Through this project, we hope to bring people from all different backgrounds together and inspire even more people to spread the same messages of world peace.

Yusuf Peker and Raymond Bakan, *Plaza built by water bubbles.* We are both Turkish student who study architecture in OCC. We both took Arch 230/H with Prof. Dean Abernathy on Fall 2018. In 16 weeks, we developed a lot of resources about the sea-level-rise, which is a challenge for our worlds for the last couple of decades. We mainly focused on an area which is close to where we live and where OCC is. According to our studies, Newport Beach would be flooded in 20 years. As we are in 2019 and do not see anyone who tries to fix that problem before it occurs, our goal is making awareness for all people by building a plaza monumental structure right next to the Fire Building in Newport Beach one next to the pier. For the symposium, we are going to show a physical model of the monument in 1/16 scale and a poster to explain why what and how to give a clear understanding for its visitors. Our monument would be built by water bubbles, so it is going to be a place where Newport Beach visitors go and see the bubbles which are full filled with water. However, in case of increasing sea level, those bubbles will get bigger and bigger so people will scary and they will lose the walk-ability of the monument.

Mariangeles Pérez, *Building Mathematical Intuition with Extended Function Notation.* The presentation of an innovative way to analyze calculus mathematics. Traditionally reserved for graduate students, this method is accessible to both experienced and novice students, and is designed to complement rather than replace classical techniques. The goal of this method is to extend the concept of functions and function notation which promotes deeper understanding, while reducing computational errors and helping to build valuable skills of intuition in mathematics. A visual demonstration will be given using both elementary mathematics and calculus. The objective is to improve confidence and promote interest in mathematics by presenting an inventive tool to aid students in viewing problems from a fresh perspective.

Tegan Roberts, *Recent women's movements as rites of intensification.* Anthropologists define rites of intensification as encouraging “solidarity by uniting people in a common effort to overcome or face up to the problem or danger, until the natural balance is restored” (McDougal). This paper poses the question: can the ways in which American citizens are coming together in

response to the current administration and recent troubles in our country be considered rites of intensification?
In order to answer this question, I will focus specifically on women's issues, in particular three movements: #metoo, the women's march, and the increase in women running and being elected for office. I will look at publicly available data of women running and elected to congress, those involved in the #metoo movement, as well as the women's march. I will also analyze data I gathered through interviews of those connected to these movements.
In this time of doubt, upheaval, and disagreement not just over opinions, but even basic facts, rites of intensification are important to reaffirm the society's commitment to a particular set of values and beliefs.

Joanna Sanchez, *Perception of Body Image.* Thinness is one of the main beauty standards, and previous studies consistently supported that internalization of the thin ideal can contribute to body dissatisfaction, low self-esteem, and eating disorders (Sides-Moore & Tochkev, 2011; McLean, Paxton, Wertheim & Masters, 2015). Moreover, women in those studies developed distorted body images after seeing thin images and reported that they were heavier than their actual weight (Moussally, Grynberg, Goffinet, Simon, & Van der Linden, 2017). However, these previous studies only asked women to compare their bodies to the thin models and did not test how people in general would judge others based on the body shapes. Thus, the current experimental study of college students examined the effect of body mass on the evaluation of attractiveness, social status, and personality. A total of 21 Orange Coast College students participated in this study. The participants were asked to observe a picture of an obese woman and a picture of a thin woman. The descriptions of the two women were identical. And then, the participants rated the women using the attractiveness, social status, and personality scales. The result partially supported the research hypothesis. The thin woman was rated as more attractive than the obese woman; however, both women were rated equally on social status and personality. The current study indicated that the physical characteristics partially influence on how individuals judge others based on their weight, which can lead to prejudice against overweight and obese people. Since the current study used psychology students from an advanced class, they may have showed less prejudice, or it can be because of social desirability. Future research should consider conducting this experiment online to minimize social desirability and use a large sample to increase the generalizability of the findings.

Samuel P Satin, *Bike Yard.* Orange Coast College(OCC) recently saw an increase in number of bikers on campus. Research conducted by Perkins & KTUA shows that with the opening of the wheeled transportation loop, the number of people riding bikes on campus increased by 2.8% and the number of bikers using the wheeled transportation loop increased by 40%. Also, the number of bikers are expected to increase even more with the planned addition of student housing on campus. Bike repair tools are expensive, having a location at OCC where OCC students could have easy access to these tools and help could help them in keeping their bikes in good shape at low-to-no cost. Adding a small facility on campus for bike repair would be a good way of keeping the tools in a secure area and having a space for people with bikes to repair their bikes or get help repairing their bikes. Since biking is a sustainable mode of transportation the structure should reflect that by being sustainable itself. This can be done using re purposed shipping containers to create small buildings for locking up tools, storing bike parts, and possibly a sheltered space to work on bikes and solar panels for powering small lights for working in low-light conditions.

Noah Anthony Sharpe, *Rate of co2 absorption by sea palm*. Local Sea palm is a type of giant kelp found off the west coast of North America and other colder climates of the world. Several studies related to Kelp growth indicate a large drop in Coastal erosion and cleaner ecosystems along our California coastline as well as increase in wildlife population where kelp is present. I hypothesis that the sea palms ability to take up large amounts of co2 will greatly benefit the surrounding ecosystem and reduce our carbon footprint while simultaneously increasing the oxygen in the water and strengthening the local marine environment. In a attempt to understand how the giant kelp grows, it will be grown in a sealed 20 gallon tank with regulated mineral and gas input. Minerals and gases such as Co2,O2, Nitrate,Nitrite,PH,KH and ammonia will be directly or indirectly measured. Unlocking what nutrients this plant absorbs will not only further our understanding of this species, but will also provide potential for healthier ecosystems in the future. The anecdotal evidence suggests that the sea palm is able to take out a significant amount of co2 in the water and balance out the PH of the tank by production of oxygen. I will be conducting tests until march 15 to get as much data as possible. In conclusion, should my hypothesis be correct and the sea palm is able to take up a significant amount of co2 then I Plan on starting ocean farm with sea palm and other kelp to reduce the carbon acidification in the ocean and provide cleaner ecosystems.

Cheyenne Sherrill, *Measuring the light from Cosmos01, a gravitationally lensed galaxy, in order to study the physical properties of distant galaxies.* 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 1.539E-10Jy, and a Magnitude, or brightness, (M*) of 1.522E+11Jy. We must continue to study distant galaxies for further understanding of galaxy formation and evolution.

Jonathan Sorensen, *Comparison of the Growth of Radish and Carrots in Aquaponics and Soil.* Aquaponics is the combination of soil-less crop and fish farming. Because of this, it is an efficient means to grow produce and provide protein in one confined system. Nutrients from fish waste water flows along through the roots of plants thus removing waste and maintaining clean water for the fish and a source of nutrients for the plants. Aquaponics systems are scalable and can provide both industrial options as well as small scale urban implementation. The most recent US Government National Climate Change Assessment report highlights the need for large scale adoption of Aquaponics. One of the reported downsides to aquaponics is that it can be difficult to grow root vegetables. My goal is to test this claim in regards to the growth of commonly grown root crops. This project consists of three sets each of carrots and radishes grown in OCC's aquaponics system, as well as fertilized soil pots each. One of the grow beds is media (baked clay beads) while the other is raft (floating styrofoam insulation with holes drilled in for the plants to sit), this way I could test different styles of aquaponics. At the

end of the growth period all plants were harvested; their fresh and dried weights were measured. Preliminary data shows that the radishes in soil outperformed both aquaponics while carrot growth was equal across all growth conditions. These results suggest that when it comes to root crops these two methods of aquaponics are inferior to traditional farming. An alternative method of aquaponics needs to be developed in order to equal or surpass traditional farming methods for root crops. One such solution already has been developed in the form of Wicking Beds which uses capillary action to provide a more natural growing environment for root crops, this method shows promising results and requires further testing. Commercially and environmentally, it is more efficient to switch to aquaponics over traditional farming methods for the vast majority of crops in order to help solve water conservation, and nutrient runoff issues among others.

Trent Stradley, *Proposal for Public Artwork on Campus.* Public art on college campuses is essential toward fostering creativity and cultural perspective in students and faculty. I want to propose a public art committee at Orange Coast College, that showcases professional artwork around campus. Implementing this program will improve the atmosphere of campus and add to the school's superior reputation. History has shown that artwork in public spaces reduces anxiety and promotes critical thinking in an environment that often produces stress (Stuckey and Nobel). The Orange Coast College campus contains empty or unattractive locations that are not being utilized to their full potential. Enlightened through the richness of artwork, everybody who interacts with the campus, can improve their approach of communication through different mediums of expression. Using artwork, we can help bridge the disciplines by creating an environment that uses design, mathematics, and environmental awareness to reach out to all of its viewers. This kind of project has been done in the past with UCSD, Florida International University, Cerritos College (a similar Community college), and many more educational facilities (stuart collection) (Delgado) (Cerritos College). This program is attainable and will improve the campus as a whole. The benefits of public art will be worth the efforts, enriching the cultural perspective and creativity of the college.

Bethany Yates, *Culturing of Phytoplankton to Establish an On-going Live Foods Program.* One problem facing fisheries and aquarium fish trade is our inability to breed species of interest in captivity. My goal is to establish a protocol for the advanced keeping of marine phytoplankton, specifically *Nannochloropsis sp.,* that can be sustained long-term by beginner and advanced

aquarium students at Orange Coast College. Larvae of marine fish have specific dietary requirements and feeding adaptations; they need very small, very nutritious live foods like phytoplankton. My results are as follows. Glassware and other utensils sit for 24-hours in an Alconox solution and rinse with RO water. Cultures need 2600 K lighting, bright-white t-5 fluorescents, on a 16-hour photo-period. RO water is treated with bleach, 1 mL per L, and sodium thiosulfate, 0.1 g per mL bleach, and the solution sits for 24-hours. Thirty-two grams ocean salt per liter of water is added. One drop of fertilizer per 100 mL of water is added and sits for 24-hours. The culture is diluted at a rate of 60% culture and 40% new media every 3 days. Medium aeration is adequate for circulation of cells with minimum cell damage. Using this protocol, we grow 500 mL of culture into 5 liters weekly, more than we can use. This is the first step in a three-stage program. The second is growing zoo plankton, like rotifers or artemia. The third is rearing larval clown anemonefish from brood stock. Our program will be at the cutting-edge of aquarium science, pioneering environmentally responsible alternatives to harvesting ornamental fish off the world's reefs, not to mention the strong relevance in fishery restoration.

Brittney Yore, *The Effects of Improved Nutrition in Captive Elasmobranchs at the 'Dennis Kelly OCC' Aquarium*. Elasmobranchs are a unique and desired fish to have in aquariums, however, they are difficult to maintain due to their specialized diets, husbandry needs, and filtration or tank requirements. The 'Dennis Kelly Aquarium at Orange Coast College' currently has an adult, female swell shark given to us with a goiter 25cm curved width and a female, juvenile horn shark with positive buoyancy and stunted growth issues. This study will investigate possible solutions for these two species of sharks by altering their diet and implementing proper nutrition. Due to the goiter, the swell shark was tube fed blended fish and mollusks 40mL with 8.12mg of Potassium Iodide biweekly. After two months the goiter decreased to half the size, we can see more rows of teeth, she can fit pieces of shrimp in her mouth, and no longer tube fed. With the change in diet from tilapia to clams, the horn shark grew from 18cm to 21cm and now weighs 0.35lb. Noncaptive juveniles are between 1-1.6 ft (35-48 cm) total length. Bottom depth times increased to 12 hrs a day and she is more negatively buoyant. In changing their diets and adding supplements, we were able to see improvements in both species of sharks. This research and study will be valuable for future students, feeding procedures for the aquarium program, and more notably the overall health of the sharks at the 'Dennis Kelly Aquarium.'

Daniel Yos, Owen Osborne, and James Davis, *Recreating the Classic Film Camera for the Modern Age*. As film photography makes a comeback, there is no product on the market that is affordable, dependable, and versatile that functions as a compact film camera for the 21st century. 35mm cameras are returning to the mainstream, but their age and quality are lackluster at best (not to mention the failure of electronic components in out-of-date cameras). The goal is to create a reliable, fully mechanical camera using medium-format film over 35mm - enhancing the quality of photos substantially. Medium-format brings about new challenges: specifically the focusing distance - making size and portability an issue. This compact camera features a custom retracting lens feature - hiding the lens within the body. Additive manufacturing is used to minimize the cost.

Project RAISE
Undergraduate Research at
California State University, Fullerton

Project RAISE focuses on increasing the number of Hispanic and low-income transfer students who complete bachelor's degrees in STEM and enter a career in these fields. The Project RAISE undergraduate research program offers summer opportunities for selected community college students to gain first-hand experience in scientific investigation in a dynamic, collaborative research environment with CSUF faculty. Project RAISE also offers partner community colleges a transition program for STEM students transferring to CSUF. Participants in the RAISE Transfer Program (RTP) receive priority registration as well as access to academic, graduation and career specialists.

In 2018, five OCC students conducted research at CSUF as part of Project Raise. Below are the student abstracts.

Andrew Alvarez – Faculty Advisor: Dr. Parvin Shahrestani's Lab
Developing a method for the dechorionation of Drosophila melanogaster eggs.
It is known that gut microbial populations have a significant influence on their host's physiological traits. However, the role of individual bacteria that are present in the Drosophila microbiome as it relates to aging is not well researched. Therefore, our research is focusing on observing the relationship between the bacteria in the microbiome and the evolution of physiological traits. One such way to do so is to create a population of flies with a sterile microbiome completely void of bacteria and raise them in a sterile environment which will act as our control group. In order to accomplish this, we must bleach the fly eggs in order to rid them of any native bacteria. The fly population will be kept in large sterilized acrylic cages. They will also be fed the UCI banana diet that has been sterilized through autoclaving. Five days after the flies have enclosed from their pupa cases they will be homogenized, plated, and plated on mMRS agar plates, which will be incubated to observe the growth of any bacterial colonies. The predicted results should show uninhabited dishes as no bacterial growth would be seen in sterile populations of flies. The creation of these sterile generations would, therefore, lead to future introduction of single bacteria species and analysis regarding changes in longevity.

Andrea Cilliani-Mineau – Faculty Advisor: Dr. Leigh Hargreaves
Differential Cross Sections from Elastic Electron Scattering In H2O
This experiment sought to resolve some skepticism based on previously-released differential cross sections (DCSs) from elastic electron scattering for water. Since water's dipole moment causes uncertainty in its gas diameter, which may have resulted in the discrepancy between these values, this experiment also sought to establish a relationship between the differential cross section and gas diameter. A crossed beam electron spectrometer with a resolution of 150 meV took measurements of elastic scattering at 20 eV, 25 eV, 30 eV, and 50 eV for angles from 15°– 119°. DCSs are presented for these angular and energy ranges, as calculated using the Relative Flow Method. These DCSs are compared to theoretical values, calculated using the Schwinger Multi-Channel Method with Pseudopotentials, as well as other, accepted experimental values. Presented also, in order to determine the dependence of DCS on gas diameter, is a comparison of target to helium cross section ratios to various gas diameters. It was discovered that DCSs are not as sensitive to changes in gas diameter as some have previously assumed. As well, the gas diameters that have been assumed in previously-conducted experiments are incorrect, leading to lower-than-expected DCSs.

Kha Nguyen – Faculty Advisor: Dr. Nina Robson
Supporting Orthotic Wheelchair for Disabled Quadrupeds
Our research laboratory designed and developed a mechanical orthotic wheelchair that was compact, light, sturdy, and able to support and allow Heidi, a chihuahua mix who had a disease known as Erosive Immune-mediated Polyarthritis (IMPA), to comfortably move, sniff, and sit. IMPA was a disease in which the immune system mounted an inflammatory response within the joints, causing pain, swelling, and difficulty walking. Since Heidi's bones were too brittle to hold pins and to withstand surgery, she needed a walking-supporting device as her conditions worsened every day. Commercially-available dog wheelchairs were often made with steel and PVC pipes, thus becoming stiff, bulky, and preventing the dog's natural movements. It was also a difficult task for Heidi's owner to put her in a complex wheelchair with multiple straps and to always supervise her during the wheelchair usage time. Assessing the weaknesses of these traditional devices, our team approached the design phase by determining the product's requirements along with getting Heidi's body measurements from multiple interviews with her and her owner. Based on the gathered data, a few suitable designs, which were simplistic with fewer straps, light, and allow Heidi to comfortably move and sit, were created using a CAD software (e.g. SolidWorks®). Once the design was finalized, it was fabricated

with rapid prototyping techniques (e.g. 3D printing). Based on the results from first trial with Heidi, modifications and improvements of the prototype were necessary, and a second design would be made. The redesign process would be repeated until a fully-satisfactory design was accomplished. This design was hoped to be able to have more functions such as being foldable and collapsible for the owner's convenience and customizable for different dog sizes, to assist many dogs in the future.

Thu Nguyen - Faculty Advisor: Dr. Yun Tian
Multiclass Classification with Support Vector Machines Apache Spark
Multiclass classification is a problem of making predictions of one group among many that one instance belongs to, which can be solved by converting it into a set of small binary classification problems. Support Vector Machines (SVM) is a machine learning algorithm that can classify one instance into two classes by drawing the maximum-margin separator. In this paper, different methods of breaking down the multiclass classification problem are compared in terms of time, efficiency and accuracy of the predictions. The methods include one-versus-one (OVO), one-versus-all (OVA) and Centroid-based Binary tree Structured SVM (CBTS-SVM); they are implemented in Apache Spark with the new DataFrame API.

Leslie Sanchez - Faculty Advisor: Dr. Merri Lynn Casem
Observations of Bacteria on Latrodectus Silk
This research is to prove that spider silk can potentially kill bacteria when making contact for several hours to days. To prove this, I put spider egg sacks in a bacteria spread and left the samples aside and labeled each one with different hours on how longs the bacteria would be on the silk. These hours ranged from 24 hours to around 300 hours. I would then put the sample in a soy agar plate and wait to see if any bacteria grew after a few days.

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.