23RD ANNUAL

RONALD E. MCNAIR SCHOLARS

UNDERGRADUATE RESEARCH SYMPOSIUM

APRIL 28, 2022

PRESENTED BY: CAL POLY MCNAIR SCHOLARS PROGRAM

DIRECTOR'S NOTE

DR. ALEJANDRO MORALES

Welcome to the 2022 Annual Ronald E. McNair Postbaccalaureate Achievement Program Symposium! I am Alejandro Morales, the program's new faculty director and associate professor of Psychology at Cal Poly Pomona. Each year our scholars work closely with their faculty mentors on projects related to their field of study. Our symposium offers our scholars the opportunity to showcase their work to their fellow McNair scholars, peers, faculty, and administrators.

The covid-19 pandemic disturbed all aspects of our daily lives, and the McNair Scholars staff worked diligently to ensure that our scholars felt a sense of community and continuity. When public health lifted restrictions, we transitioned to in-person instruction. The scholars were excited to resume their research activities in their mentor's labs, meet with mentors and peers in person, and use the McNair Scholars lab.

The McNair symposium is the culmination of the scholars' hard work and dedication. They are excited to talk about their results and what they accomplished in the past year. Some of them will move on to graduate (MA & Ph.D.) programs at universities across the country, such as Cornell University, University of Arizona, Ball State University, Cal State Los Angeles, Cal State Fullerton, University of California, Berkeley, University of Colorado, Indiana University, University of Southern California, University of Texas. A few of our scholars will participate in summer research programs at universities like Purdue University and Johns Hopkins University. The rest of our scholars will stay close to home and apply to graduate programs next year.

Lastly, as the academic year ends, we say goodbye to cohort 23 and welcome cohort 24. The McNair Scholars program remains an exemplar at Cal Poly Pomona for supporting and mentoring first-generation, low-income, and underrepresented students in pursuing doctoral degrees and becoming college professors.

Congratulations cohort 23, we are so proud of you!

Alejandro Morales, Ph.D.

Symposium Schedule

BREAKOUT ROOM: CAMPUS VISTA

Time	Scholar	Major	Research Title
2:40 pm	Nicole Luna	Mechanical Engineering and Physics	Elastic mechanical metamaterials for energy absorption
5 min break			
3:00 pm	Noor Halabi	Chemical Engineering	Development and characterization of an Aspirin transdermal drug delivery patch
5 min break			
3:20pm	Diana Morales	Applied Mathematics and Electrical Engineering	Efficiency of the simplex algorithm the transportation and assignment problem case
5 min break			
3:40pm	Tristan Scharfenstein-Montgomery	Computer Science	Recovery from a firmware attack on drones
5 min break			
4:00pm	Ryan Sandoval	Computer Science	Autonomous Flight of High-Endurance UAVs to Monitor Powerlines
5 min break			
4:20pm	Bryan Ramirez	Biotechnology	Investigating the growth of different tritichomonas foetus strains at different pHs

Symposium Schedule

BREAKOUT ROOM: MOUNTAIN VISTA 1

Time	Scholar	Major	Research Title
2:40 pm	Sara Carrillo	Nutrition-Dietetics	Effect of Omega-3 FA and Probiotic Supplements on Selective Attention
5 min break			
3:00 pm	Natali Mendez	Food and nutrition dietetics	A relationship between diet and exercise patterns on the consumption of protein supplements
5 min break			
3:20pm	Vanessa Langarcia	Biology	Disinfection Capabilities of Nanofiber Membrane Functionalized with Antimicrobial Peptide
5 min break			
3:40pm	Maranda Hernadez	Animal Science	Analysis of successful completion of endurance horses undergoing the Tevis Cup
5 min break			
4:00pm	Vivian Hyunh	Animal Science	Analysis of endurance horses eliminated during the Tevis Cup
5 min break			
4:20pm	Emily Frisian	Geography	Making the presence of EBT at California Farmers Markets

Symposium Schedule

BREAKOUT ROOM: MOUNTAIN VISTA 2

Time	Scholar	Major	Research Title
2:40 pm	Kristy Corpus	Organization Communication	Cultural discourse of a matchmaker's perception on love and relationships
5 min break			
3:00 pm	Jezzabella Jimenez	Communication Studies	Transitional Bilingual education vs Dual Language Immersion: Students' views on their Preparedness for college
5 min break			
3:20pm	Omari Cunningham	Psychology/Philosophy	Assessing the relationship between social media use and sustained attention
5 min break			
3:40pm	Alicia Chhuon	English Education	The effects of texting, tweeting and internet slang on academic literacy
5 min break			
4:00pm	Thelma Perez	Early Childhood Studies	Educational disrupts and online teaching analysis of preservice educators' experiences with education preparation programs during covid-19
5 min break			
4:20pm	Luis Gaytan	Spanish	Spanish heritage language learners: reading difficulties and spelling errors.

Symposium Schedule

BREAKOUT ROOM: POLY VISTA 1

Time	Scholar	Major	Research Title
2:40 pm	Henry Sanchez	Apparel production and international business	Drivers of the adoption intention of 3d simulated software in the Apparel industry quantitative approach
5 min break			
3:00 pm	Jesus Vargas	Apparel production and Management	Evaluating the Mechanical Properties of Twill woven cotton materials: Textile waste and upcycling for increased sustainability
5 min break			
3:20pm	Arisbeb Campos Gonzalez	Sociology/Social Work	Undocumented women in higher education
5 min break			
3:40pm	Sierra Boyd	GEMS	Searching for self: The invisibility of Black women in High School U.S. history textbook
5 min break			
4:00pm	Diana Solis	GEMS	Healing Circles in Academia: creating radical self-care
5 min break			
4:20pm	T'Naya Hall	GEMS	The effects of colorism and inaccurate depictions of African American women in the media

Avia Bateman
Mentor: Michael T. Giang
Title: Do interracial friendships matter? a look at their connections with collective self-esteem

Abstract: Interracial friendships are relationships individuals have with someone from a different ethnic group. The quality (i.e., closeness, dependability, and trust) and quantity of these relationships(i.e., number of interracial friends) have been found to influence an individual's desire to learn about their ethnic group, increase their mental well-being and feelings of acceptance by other ethnic group members. Research on interracial friendship remains limited in terms of representation and scope. First, it has mainly focused on the impact of personal self-esteem(PSE) rather than self-esteem derived from membership in one's ethnic group (i.e., collective self-esteem). Second, researchers mainly focus on interracial friendship among White participants rather than across different ethnic groups. The present study examined the connection between the quality and quantity interracial friendships have with personal and collective self-esteem (CSE).CSE is self-esteem based on one's ethnic group membership and how confident they feel within it. CSE consists of four subscales: Public (one's perception of how other people might view their ethnic group), private(personal view of the quality of one's ethnic group), membership (worthiness of being a member of an ethnic group), and identity CSE (connection or identification with one's ethnic group).Participants were 330 southern California university students (58% Latinx, 14% Asian, 7%White, 2% African American, and 18.3% other/multiracial). Correlation results found that the number of interracial friendships were not related to PSE (personal self-esteem) but was significantly correlated with decreases in private and identity CSE. In contrast, the quality of interracial friendship was significantly related to increased PSE and membership, private and public CSE. Contrary to previous findings, these results suggest that the increase in the number of interracial friends may contribute to misjudgment and promote connection with one's ethnic group. While intergroup friendships may promote a greater understanding of other cultures, they may limit individual discussion and exploration about one's ethnic group. However, consistent with previous literature, the quality of interracial friendship (in terms of support, trust, closeness) has positive effects. Implications will be discussed in terms of respecting ethnic differences as well as understanding intra and inter group friendships.

Biography: Avia Bateman is a Psychology major at California State Polytechnic University, Pomona and is part of the 2021-2022 McNair Program cohort. She is from Chula Vista, CA and is the oldest of three siblings. Avia throws hammer on the Track & Field Team at Cal Poly Pomona. In her free time, she likes to doodle, write poetry and hike. Avia is currently working on a research project with her mentor, Dr. Michael T. Giang, on "Do interracial friendships matter? A look at their connections with collective self-esteem". She wants to pursue a PhD in School Psychology and has already been accepted into multiple doctoral programs. She hopes to develop programs to address mental health disparities for youth in underrepresented and underserved communities and schools.

Sierra Boyd
Mentor: Dr. Shayda Kafai and Dr. Analena Hassberg
Title: Searching for self: The Invisibility of Black women in High School U.S history textbook

Abstract: Although representation and inclusivity for Black women within the media have increased within recent years, it seems that the U.S history curriculum has yet to reflect this shift(Adams-Bass et al., 2014; Schocker and Woyshner, 2013). Searching for self: The Invisibility of Black Women in U.S history came into fruition by observing the omissions of Black history available to K-12 students, specifically Black women's contribution to U.S history. When Black women's abilities, contributions, and worth are omitted, so too, by extension, are those of developing Black youth. By interviewing Black students, I ask participants to recall their high school experience of U.S. history. How education might impact a child's perception of the world during crucial developmental years, and what affects the omission of Black history has on Black women and girls' self-image and understanding of position in this world? By expanding on these critical questions, this study serves to use the first-person narratives of Black women college students to reevaluate education's anti-Blackness. This study asks how giving youth the opportunity to reflect and the power to reform their education through acknowledging the ways anti-blackness impacts their access to equitable education, might empower and incite social transformation. How can the stories of these women serve as the beginning of a shift in how U.S. history is taught? After the study is complete, I hope to prove that representation matters in positive self-perception in young Black students because representation gives unconscious permission to take up space. It is essential to reinforce Black students' importance and value in their history courses because their educational setting is one of the first places to learn aboutthemselves.

Bio: Sierra Boyd is a fourth-year undergraduate at California State Polytechnic University, Pomona, who is studying Ethnic and Women's Studies and is part of the 2021-2022 McNair Scholars cohort. During the beginning of her time at Cal Poly Pomona, she was accepted into a summer program for incoming freshmen called Bronco Scholars, where she was required to take her first Ethnic Studies course. Through this introductory course, the idea for her McNair Project and Senior Capstone was born. Her current project with her mentors Dr. Shayda Kafai and Dr. Analena Hassberg: Searching for self: The Invisibility of Black Women in High School U.S history Text books aims to explore how a lack of representation of Black women in K-12textbooks may impact Black women's self-esteem and identity formation.

Arisbeb Campos Gonzalez
Mentor: Dr. Jose M. Aguilar-Hernadez, Associate Professor
Title: Undocumented Women in Higher Education.

Abstract: The undocumented student population in the California State University (CSU) system, has increased in the past years (Teranishi, Suárez-Orozco, & Suárez-Orozco, 2015). Today undocumented students can achieve their dreams by attending a 4-year university with some government assistance. We know that California's AB 540, and Dream Act are two policies that help undocumented students pay for in-state tuition and receive financial aid. A large population of undocumented students is Latinx/a/o communities within higher education. However, with many laws changing at the federal level, it is uncertain how the education system will change for undocumented students in years to come. How do California's laws impact students in their decision-making to go to graduate school? The focus of this study is to map the experiences of undocumented students in higher education. Specifically, this research project explores the decision-making process that undocumented students engage in when considering graduate school. There are few research projects that document the decision-making process of undocumented undergraduate students, who are considering and enrolling in graduate school. What factors and influences contribute to undocumented students' decision-making process to pursue a master's or doctoral degree? My research design will be a qualitative method, conducting semi-structured interviews of current undocumented undergraduate and graduate students. The first group will be undergraduate undocumented students at Cal Poly Pomona. The second group of participants will be undocumented students enrolled in a graduate program at any accredited higher education institution in California. All participants must be 18 years of age or older. The measures will understand how undocumented students navigated undergrad, and what factors contribute to their graduate school choice/trajectory. I want to engage with undocumented students who are interested in pursuing a graduate school. We need to examine new ways of creating policies and practices that center on social justice: undocumented students pursuing higher education. Funding opportunities for undocumented students are scarce at the undergraduate level, and even more in graduate school.

Bio: Arisbeb Campos Gonzalez is a fourth-year undergraduate at California State Polytechnic University, Pomona who is studying Sociology with an emphasis in Social Work a minor in Chicana/o and Latina/o Studies. In her previous years, she studied at Fontana High School and work as an AVID tutor at a middle school and Orientation Leader virtually during the summers of 2020-2021 as she welcomed incoming students. She is a Teaching Assistant for a Social Work course Dr. Narayan teach on Family Violence and a Peer Mentor ambassador for the Sociology department. Her current research involves the experiences of undocumented students in higher education as an undergraduate or graduate student. She plans to receive her MSW and her Ph.D. in Sociology where she can gain hands on experience to socially benefit her community through advocacy, research, and professorship. During the fall semester of 2022, she will be applying to graduate school.

Sara Carrillo
Mentor: Dr. Bonny Burns-Whitmore, RD, MCHES
Title: Effect of Omega-3 FA and Probiotic Supplements on Selective Attention

Abstract: The ability to pay attention is crucial for learning and social interactions. Omega-3 fatty acids (n-3 FA) and probiotics play a role in neurodevelopment, neurofunction, and participate in the relationship between the brain and gut microbiome. This study's purpose is to determine if n-3 FA and probiotic supplements improve selective attention in a sample of neurodiverse adult human subjects, ages 22 to 34 years old, at Cal Poly Pomona. Further research investigating the relationship between nutrition and cognitive function in adults is needed. Our study will be using a higher dosage of EPA and DHA than past studies. Because every brain is unique, this study will be a crossover design to observe the effect of both supplements on each individual. Past studies measuring attention have not considered how stress experienced by a subject in a research setting may affect results. Therefore, this pilot study will differ by having subjects meditate prior to measuring selective attention, which will be measured using the Stroop Color and Word test. During testing, subjects' heart rate variability and emotional wellbeing will be measured by the Scale of Positive and Negative Experience (SPANE) and an ear pulse sensor. If results show positive effects between probiotics and/or n-3 FA and selective attention, nutrition supplementation may be seen as a way to help improve and support cognitive function. Investigation of the effects of n-3 FA and probiotics on selective attention may support the relationship between one's diet and cognitive function, and potentially benefit those with attention difficulties.

Bio: Sara Carrillo is a fourth-year transfer student at California State Polytechnic University, Pomona who is studying Nutrition and Dietetics. Carrillo transferred from Mt. San Antonio College where she obtained her Associate in Arts in Liberal Arts and Sciences: Natural Sciences and Associate in Science Degree in Nutrition and Dietetics. Carrillo wants to raise public awareness on how components of one's diet may influence neurodevelopment and neurofunction. Her current research looks at how omega-3 fatty acid supplements and probiotic supplements affect an adult's selective attention. Her future research interests include implementing evidence-backed nutritional interventions in underserved communities with people of color who are diagnosed with Autism Spectrum Disorder. Her goal is to help nutritionally support these individuals so they can realize their fullest potential. She plans to receive her Ph.D in Nutrition which will help her gain the skills needed to become a research dietitian, nutrition professor, and community leader. She has been accepted to the Nutrition Ph.D program at Cornell University and will begin her doctoral studies in Fall of 2022.

Alicia Chhuon
Mentor: Dr. Olga Griswold
Title: The Effects of Texting, Tweeting and Internet Slang
on Academic Literacy

Abstract: Young adults born at the turn of the 21st century are brought up with new modes of connecting with friends and peers online. As a result, they tend to communicate in a more informal register. This includes using informal grammar, spelling, punctuation, internet jargon, and acronyms. In this research project, I conduct a survey of literature on the potential effects of online communication on formal literacy, which will be followed by an online survey and subsequent semi-structured interviews with college level students ages 18 to 25. The goal of the empirical portion of the study is to see how students perceive the effects of active use of social media affects their own academic writing. This research project will provide insights on the relationship between the two modes of written communication.

Bio: Alicia Chhuon is currently in her third year of her undergraduate degree at California State Polytechnic University, Pomona as an English Education major and Writing Studies minor. She currently works as a tutor for the Covina Valley Unified School district. Her current research delves into the implications that texting and internet slang have on academic literacy, and how students perceive the effects of active use of social media on their academic writing. She plans to receive her Masters in Education, along with her teaching credential here at Cal Poly Pomona, where she can then gain the tools needed to progress academically into a Ph.D. program in English. Her long term goal in the future is to eventually be an educator, to teach the newer generations the beauty of the English language.

Kristy Corpus
Mentor: Dr. Sunny Lie Owens, Ph.D. Associate Professor
Title: Cultural Discourse of a matchmaker's perception on love and relationships

Abstract: The study we conducted will put U.S. mainstream cultural understandings of "love" at the center of our analysis. We interviewed 12 professional matchmakers, who deal in the business of love daily. Using Cultural Discourse Analysis as our main theoretical framework, we are looking to unveil cultural perceptions of love from the view of those who do it for a living. We hope that having these cultural understandings of love, dating, and relationships from an "expert's perspective," will help us gain a better understanding of the U.S. American deep-seated, potent beliefs of "love" as a cultural phenomenon.

Bio: Kristy Corpus is a fourth-year undergraduate at California State Polytechnic University, Pomona who is studying Interpersonal Communication. In her previous years, she studied at Citrus College where she earned her Associate of Arts in Communication Studies. She is a senior account executive for FloWater and is the number one account executive in the organization. Her current research focuses on cultural discourse analysis of matchmaker's perceptions on love and relationships. She plans to earn her master's in Communication Studies; with this degree she plans on being an instructor of Communication at a local community college.

Omari Cunningham
Mentor: Dr. James Sturges
Title: Assessing the Relationship Between Social Media use and Sustained Attention

Abstract: Social media and social networking have become enormous parts of our daily lives. It is evident from the changes in the way we interact with each other interpersonally, to their rapid integration as the preferred modes of communication adopted in educational and vocational domains. Problems arise however when we become fixated on garnering likes, retweets, and tags on various social media platforms. We find ourselves spending more time than intended on these sites, coming up with witty tweets or finding just the right selfie angle. There is good reason to believe that these undesirable outcomes are not entirely our fault. Documentaries like 'The Social Dilemma' contain testimony from engineers of these apps; claiming that the apps are in fact, strategically designed to grab and hold onto our attention. Furthermore, the literature reveals several studies ranging from broader topics such as symptoms of psychological disorders and their relationship to addictive video games and social media use (Andreassen et al., 2016), to more specific topics like smart phone use and everyday inattention (Marty-Dugas et al., 2018). The findings from Andreassen suggests a strong correlation between ADHD symptoms and addictive social media use. It is possible that social media influences these symptoms, but it has yet to be determined in what way. As such, this study intends to investigate the potential relationship between social media and sustained attention by collecting survey data on a large sample's general social media engagement habits with subsequent data analyzation.

Bio: Omari Kamau Wa-Tenza Cunningham is a third-year undergraduate at California State Polytechnic University Pomona, studying Psychology and Philosophy. In their previous years, they studied at Rio Hondo Community College and worked several odd jobs during their community college career. Their current research explores the possible influence that social media has on attentional capacity. Long-term, they plan on obtaining their Ph.D. in clinical health psychology to gain the necessary tools and licensure for producing efficacious clinical treatment to a diverse range of clientele. For the time being, they are focused on completing a manuscript for their research project titled "Assessing the Relationship Between Social Media Use and Sustained Attention". During the fall semester of 2022, they will be applying to in and out-of-state graduate school programs and will be taking a gap year to recharge in preparation for graduate school.

Emily Frisan

Mentor: Dr. Kristen Conway-Gomez, Department Chair of Geography and Anthropology

Title: Making the Presence of EBT at California Farmer's Markets

Abstract: Farmer's markets have grown since the early 2000s as locations for community development and small businesses to participate in local spaces. This study will examine locations of farmer's markets accepting Electronic Benefits Transfer (EBT) and use data of markets, farms, and the US Census Bureau to determine comparative differences. As an electronic system, EBT allows a Supplemental Nutrition Assistance Program (SNAP) participant to pay for food using monthly benefits to assist low-income households. Small markets are sources essential for low-income communities, yet economic and cultural factors stimulate areas for growth in all areas of California. There is little known about the barriers of EBT creating more positive shopping habits and community experiences for low-income consumers and people of color at Californian farmer's markets. This study will examine ways that farmers' markets are less visited, and therefore less accessible to low-income households in need of EBT. Previous research has shown low-income participants have found barriers for SNAP participants include user compatibility, supermarket competition, and diffident guarantee for fresh produce. This research uses Geographic Information Systems (GIS) to spatially map, visualize and examine census demographics such as median income, race, and ethnicity to find the most statistically significant differences between counties with farmers markets that accept EBT to counties with farmers markets that do not.

Bio: Emily Frisan is a fourth year undergraduate at California State Polytechnic University, Pomona who is studying Geography and Anthropy. In her previous years, she was actively involved in student organizations and continues to intern with various organizations and work on campus to serve students. Her current research delves into food insecurity and the equity of health. She plans to receive her M.S. in Food Studies where she can gain the tools needed to academically and socially benefit her community through professorship, research, and service. Her short term plans include writing for science journalism publications and community services. Her long term plans adhere to the promotion and advancement of higher education. During the fall semester of 2022, she will be applying to in and out of state graduate school programs and continuing work for private industries.

Luis David Gaytan Soto

Mentor: Amalia Llombart-Huesca & Professor of Spanish Linguistics
Title: Spanish Heritage Language Learners: Reading difficulties and spelling errors

Abstract: In recent years, we have witnessed an increase in studies on Spanish Heritage Language Learners' (SHLL) spelling proficiency of SHLLs, mostly error analyses that use either naturalistic data (Beaudrie 2012, Belpolitti & Bermejo) or (quasi-)experimental data (Beaudrie 2017, Llombart-Huesca & Zyzik (2019) to find out what the most frequent errors in SHLLs' writings are. Llombart-Huesca's (2019) study suggests that vowel misspells involving the letters e and i are due to difficulties in phonological awareness, which are greater in phonological complex contexts, such as diphthongs. Although no study has been conducted yet connecting spelling and reading fluency in SHLLs, Llombart-Huesca (2019) makes the observation that although SHLLs can read fluently, once they encounter certain words, (e.g., long words, unknown words, and words with diphthongs, they tend to get stuck or desist from pronouncing them. Our study tests this observation to help determine whether spelling errors in words with diphthongs involving e and i are due to students' difficulties in reading them.
 In this study, participants were asked to read a list of 40 words, which appeared on screen in isolation. Items were divided in these 4 conditions (ten words in each):

	Diphthong (ie)	Monophthong (Cons+Vocal)
Real words	e.g., desciende	e.g., espejo
Pseudowords	e.g., cafiento	e.j., pamena

Words with diphthongs were hypothesized to cause more reading difficulties than words with monophthongs, mirroring Llombart-Huesca's (2019) findings in spelling. Pseudo-words were also hypothesized to be more difficult to read than real words, since unknown words cannot be recognized and need to be decoded, which requires phonological awareness. Preliminary results show a gradation in reading accuracy of the target letter "e": real-monophthong > pseudoword-monophthong > pseudoword-diphthong > pseudoword monophthong, thus, confirming our hypothesis. We discuss these results in relation to previous research in phonological awareness and literacy in SHLLs.
 These findings will benefit researchers in the SHLL education field. Underdeveloped phonological awareness hinders spelling and reading, but it might be masked by lexical knowledge and only surface when attempting to reach more advanced degrees of reading and spelling fluency and accuracy.

Bio: Luis D. Gaytán-Soto is a 4th year undergraduate at California State Polytechnic University, Pomona, majoring in Spanish with minors in history and philosophy. He also did his REU with Northwestern University. His current research involves Spanish Heritage Language Learners, phonological awareness, and spelling difficulties. Luis is perusing an MA-Ph.D. in Hispanic Linguistics to become a professor and conduct research with 1st generation under-represented students, be on collegiate committees that strive to improve student learning outcomes, and mentor students throughout their collegiate years, just like Dr. Llombart, who has not only been a professor to him, but a research partner, and, most importantly, an extraordinary and superb mentor. Luis has applied to 10 graduate programs and, as of late February, has been accepted to 5 PhDs, 3 funded MAs with the option to continue to the PhD, is waitlisted in 1 program, and is pending to hear from one more university.

Analexis Glaude
Mentor: Marie B. Lamothe-Francois, Ph.D.
Title: Familial Involvement and its Influence on Women of Color in Positions of Power

Abstract: This research highlights the success of women of color in academia, where success is defined as having a PhD. Specifically, this research aims to delve into past familial educational support systems of successful women of color to identify possible correlations between past support and future success. Research on this topic allows for the accomplishments of women of color to be celebrated and provides guidance on how to promote more women of color to obtain PhDs. The hypotheses for this study are as follows: a)Familial educational support will have a positive correlation with future success. b) Women of color became successful because of past positive familial support. c) There will be a common theme of support amongst women of color in terms of the amount of support their families provide. However, the ways in which different cultures display support may be different. This study is still in progress and currently is in the data collection phase, results will be available in time for the conference. This is a qualitative study and will use a questionnaire via Qualtrics to gather data. The questionnaire is centered around familial expectations for their children academically and familial involvement in education. This questionnaire includes questions such as: Was going to college a choice or an expectation? Did your parents expect you to obtain a certain GPA? This study will use a total of five participants (n=5) from a university in California who identify as women of color and have a PhD. This study aims to collect data from women of different racial and cultural backgrounds. Due to the small sample sizes and the ability to go in-depth with each participant and her experiences, this study hopes to use quotes from each response to compare their stories. These quotations will be included in the final paper, highlighting individual experiences. Since results are not yet available, it is expected that there will be similarities between the stories of different women, common themes that can be drawn from in order to discover ways to increase the number of women of color with PhDs.

Bio: Analexis Glaude is a third year undergraduate student and track athlete at California Polytechnic University, Pomona. She is a Psychology major with an emphasis in Industrial-Organizational Psychology. She also has experience in business through her summer internship with The Wharton School of the University of Pennsylvania where she aided in research on Covid-19 vaccination incentivization in the city of Philadelphia. Her current research, "Familial Involvement and its Influence on Women of Color in Positions of Power", focuses on women of color who have obtained success through earning a Ph.D. She is currently working on this project under the mentorship of Dr. M. Brigitt Lamothe-François. Analexis plans to earn a doctoral degree focusing on workplace satisfaction and diversity and inclusion.

Noor Halabi

Mentor: Dr. Laila Jallo

Title: Development and Characterization of an Aspirin Transdermal Drug Delivery Patch

Abstract: Aspirin is a very versatile drug that is used in the medical field to treat flu like symptoms, prevent strokes, and even delay onset of preeclampsia in pregnant women. The focus of this project is the formulation and characterization of a transdermal drug delivery patch for a baby aspirin dosage. This was designed specifically to curb the adverse gastrointestinal reactions associated with the oral administration of the drug. In this research, a water in oil emulsion containing the drug was prepared through a mixing process which suspends the Aspirin molecules in a hydrophilic phase. To enhance the dispersion of the hydrophobic component of the drug molecule, the aqueous phase was altered by the addition of ethanol. Emulsions were prepared with the following volumetric fraction of water to ethanol: 50:50, 60:40, 70:30, 80:20, 90:10, and 100:0. The ideal volumetric fraction of water to ethanol was determined from rheological characterization of the developed emulsion. The characterization methods included measuring viscosity with a viscometer; percent separation using volume fraction; droplet sizes with a size analyzer; and surface tension with a tensiometer. Subsequently, a gelling agent, Sodium Alginate, was added to the emulsion to make an emulgel. This product was then embedded into an adhesive design patch to complete the formulation of the drug delivery system. Hydrophobicity test was performed on the patch to determine the permeability of the product. This was accomplished through the determination of the contact angle with the tensiometer. Moreover, a prototype of the Franz diffusion cell was designed using SOLIDWORKS and printed for in vitro diffusion studies with a phosphate buffer solution as the receptor medium.

Bio: Noor Halabi is a second-year transfer student at the California State Polytechnic University, Pomona who is majoring in chemical engineering. She immigrated to the United States in 2016 and studied at Citrus Community College. She currently works two jobs, one as a tutor at Citrus College and the other as a Supplemental Instruction facilitator under Maximizing Engineering Potential. Her current research centers around the formulation and characterization of a transdermal drug delivery system for Aspirin. Her goal is to obtain a Ph.D. in chemical engineering where she can utilize her expertise to mentor and teach future generations of engineers. Though multiple research areas pique her interests, she plans on specializing in biomaterials and their extensive uses in life saving technologies. During the fall semester of 2022, she will be applying to graduate school programs and will be embarking on her Ph.D. journey in the fall of 2023.

T'Naya Hall
Mentor: Dr. Shayda Kafai,
Title: The Effects of Colorism and Inaccurate Depictions of African American Women in the Media

Abstract: In the 1930s, the very first time African American women (including cis-woman, non-binary, gender-fluid, and transgender) were given the opportunity of representation in the television (TV) industry, they were most commonly portrayed in Hollywood films in dehumanizing and inferior ways. Stereotypical character tropes such as the Jezebel, Angry Black Woman (ABW), and Mammy are still present and being used to stigmatize African American identities in television (Adams-Bass, et al.); the limited roles African American actresses are offered only contributes to this problem. By revealing these truths, this study is working towards a reclaiming of African American women's histories, which in turn will help to promote both individual and societal benefits (i.e., an empowered and improved sense of self-esteem and overall mental health and hopefully newfound equity within target institutions (Adam-Bass, Grable, Howard-Hamilton; Richardson; Yosso). The researchers listed in the parenthesis have either analyzed the historical effects of stereotypical character tropes used against the African American community as a whole or have created a language that can clearly explain ways in which African Americans can work towards empowering and enhancing the overall morale of the community. Black Feminist Thought, a framework coined by Patricia Hill Collins, will be used as a framework to analyze the importance of interrogating these tropes (Collins). The study focuses on the analysis of the modernized versions of these tropes in shows like Insecure, How to Get Away With Murder and All American and examines their effect on young African American women's self-esteem. In particular, this study argues that examining these characters will help to reform the dehumanization caused by these tropes, which ultimately gives this research its purpose.

Bio: T'Naya Hall is a fourth-year undergraduate student at California State Polytechnic University, Pomona who is majoring in Gender, Ethnicity and Multicultural Studies with an emphasis in African American Studies and a minor in Political Science. Not only has she maintained a high GPA, but she has also been a leader in her community, an advocate for mental health and self-care, advocated and created initiatives to help those who are less fortunate than her, and has been a beacon for social justice across a variety of issues. Through her use of oral interviews and the Rosenberg Likert Scale, she has crafted a research study that focuses on whether there is a connection that exists between stereotypical tropes of African American women on television and the self-esteem of the African American youth viewership, women in particular. Supported by her McNair Mentor Dr. Shayda Kafai, her study, "The Effects of Colorism and Inaccurate Depictions of African American Women in the Media" seeks to challenge and reform tropes like Sapphire/ Angry Black Woman (ABW), Jezebel and Mammy by looking at show like Insecure, How to Get Away With Murder and All American. As for her long term goals she intends to attend a joint program where she can obtain both her J.D. and Ph.D. simultaneously, to hopefully become either a Civil Rights attorney or IP attorney, and a forever researcher.

Maranda Nicole Hernandez

Mentor: Holly M. Greene, M.S., Equine Lecturer and Compliance and Safety Specialist

Title: Analysis of successful completion of endurance horses undergoing the Tevis Cup 160-km ride from 2016 to 2021

Abstract: From showmanship to racing, the equine industry has been inherently growing throughout time. The fastest growing Fédération Equestre Internationale discipline, second to show-jumping, is endurance riding. A popular endurance ride started in 1955 is the Tevis Cup, a 160-km ride which expands from Truckee to Auburn California, traversing through the Sierra Nevada Mountain range (AERC). The Tevis cup is composed of riders from different backgrounds, styles, and horse breeds, which include Arabians, Quarter Horses, mixed breeds, and donkeys. Given many challenges, horse health is of utmost importance. During the ride, there are mandatory veterinary checkpoints called "holds" to record the horse's health, vital signs, and each horse undergoes a veterinarian assessment to get approval before continuing the ride. Depending on the assessment, horses may be "pulled" from the ride due to the inability to reach specific requirements needed to satisfy the veterinary health check. The main goal of the rider is to ensure the horse is healthy, well-conditioned, and finishes under the allotted time without getting pulled. The current research project will focus on the analysis of completion rates of the Tevis Cup ride data from 2016 to 2021, excluding 2020 due to the pandemic, and investigate if horse endurance miles history has any correlation with the horses' ability to finish the ride. Completion rates for years 2016 – 2021 were: 57.73%, 53.49%, 42.96%, 53.27%, and 47.37%, respectively, and were not different (P=0.99). Results show that completion rates have been consistent, with the prominent finishing horses being geldings and horses of the Arabian breed. Statistics indicate that horses who have completed the ride have fewer overall kilometers in a season versus those who were pulled from the ride. Examining the results of the ride data and identifying patterns can help condition horses to be healthier for endurance rides and help complete the Tevis Cup ride for future endurance riders.

Bio: Maranda Hernandez is a third year undergraduate at California State Polytechnic University, Pomona who is studying Animal Science and following a pre-veterinary path. She's passionate about community development through continuous intern efforts at a local dairy and works at a nearby animal hospital. Her current research focuses on pattern analysis of equine endurance riding completion rates to provide insight that can help condition horses for future riding events. She plans to pursue a dual DVM and Ph.D. in Animal Science where she can gain the knowledge to benefit her community through leadership, research, and animal prosperity. Her short term plans include continuing research to upkeep animal health in the equine industry. Her long term plans intend to improve animal welfare across species including exotics, livestock, and small animals. During the fall semester of 2022, she will be applying to in and out-of-state veterinary and graduate school programs.

Chenna Hu
Mentor: Dr. Kevin Autry, Department of Psychology
Title: Writing preferences among Mandarin-English Bilinguals and English Monolinguals

Abstract: To what extent does language and culture influence writing styles? Prior literature on the intercultural characteristics of written discourse has yielded substantial empirical findings on text, genre, and corpus analyses (Sapir, 1929; Kaplan, 1966; Connor, 2004; Belcher, 2014). E arly research in intercultural rhetoric proposed distinct writing patterns across ethnolinguistic repertoires by categorizing writing styles along dual distinctions e.g. linear vs. non-linear, open vs. closed. As one of the most culturally diverse countries, scholars have emphasized the assimilation of writing customs and linguistic patterns among non-native English speakers within dynamic educational environments (Hofstede, 1980; Hinds, 1987; Connor, 2004; Sheng et al., 2014). Native Mandarin speakers purportedly engage in "non-linear" patterns of writing i.e. more digressive and inductive practices emphasizing figurative language, while English monolinguals engage in "linear" patterns of writing i.e. more concrete and deductive practices hierarchically organizing information around central ideas or themes. Although studies in intercultural rhetoric have evolved beyond these ethnolinguistic comparisons of written cultural and linguistic artifacts, fewer studies regarding the ethnolinguistic influences of writing are associated with Mandarin-English bilinguals. The present study investigated the proposed differences in cultural thought patterns between Mandarin-English bilinguals and English monolinguals at the discourse level. We anticipated that Mandarin-English bilinguals would rate non-linear paragraph structures higher, whereas English monolinguals would rank linear paragraph structures higher. These findings highlight prevailing paradigms surrounding written rhetorical features and intercultural communication emphasizing the discrepancies between linguistic and cultural styles that may contribute to misperceptions in meaning and writing orientations among interlocutors.

Bio: Chenna Hu is a senior at California State Polytechnic University, Pomona graduating with a Bachelor of Arts in Psychology and minor in History. Hu's ongoing study with Dr. Kevin Autry in the Mental Process Lab examines the historical, linguistic, and cultural aspects of written discourse among Mandarin and English speakers, of which was initially developed with Dr. Vicky Lai at the Cognitive Neuroscience of Language Lab during the University of Arizona's 2021 Summer Research Institute program. She has further assisted Dr. Jeffery Mio's research on language use in persuasion and Dr. Juliana Fuqua's team with their studies on educational development. Hu is interested in pursuing research on the historical and theoretical dimensions of cognitive psychology to advance interdisciplinary understandings of language, culture, and thought.

Vivian Huynh
Mentor: Holy M. Greene, M.S.
Title: Analysis of Endurance Horses Eliminated During the Tevis Cup 160km Ride from 2016-2019 and 2021

Abstract: Endurance riding is a competitive sport where horses ride over long distances, 120-160 km, in the fastest possible time. Endurance riding is challenging not only for the physical and mental endurance but also the range of climate, terrain, and elevation. During the ride, handlers and veterinary staff are on-site, at various points on the trail, to check on the horse's health. Horses are pulled at these vet checks for reasons such as metabolic and lameness issues. Because athletes are pushing their horses to their limit, clinical research on the sport has increased concern for the wellness of the horse. Today's modern-day endurance ride, the Tevis Cup, began in 1955 and consists of a 160-km ride in 24 hours from Truckee to Auburn, CA. This present study is an extension of previous research which examined risk factors preventing completion of the Tevis Cup from 1997 – 2004. Specifically, I am analyzing the factors contributing to non-completion rates for horses in the Tevis Cup from 2016 - 2021. The percentages of non-finishers from 2016 - 2021 were: 42.27%, 46.51%, 57.04%, 46.73%, and 52.63%, respectively (P = 0.99). This suggests that the non-completion rates for the Tevis Cup have stayed consistent during this time cycle of the ride. There were no statistical differences in the age of horses (P = 0.55). There was a statistical difference in breed: Arabians and Arabian cross-breeds were the majority of the horses, mostly due to possessing higher endurance and stamina abilities. As for sex, geldings are pulled the most from the ride because geldings are the majority of the horse population. The first Tevis Cup ride consisted of only five riders. The number of riders has increased over time with the highest number in 1987 of 271 entries and data from this current study average 160 riders for the 5-year span. This trend reflects that the equine endurance sport has grown in popularity and despite this growth, elimination rates of the Tevis Cup have still stayed consistent.

Bio: Vivian Huynh is a third year undergraduate at California State Polytechnic University, Pomona who is studying Animal Science. She continues to work two jobs as a grader for a previous film professor and as a student success leader for Student Affairs. Her current research delves into the risk factors associated with non-completion rates for horses in the Tevis Cup. She plans to receive a PhD/DVM dual degree in infectious diseases where she can gain the tools needed to address the growing challenges in animal and public health. Her short term plans include continuing animal science research and interning at animal hospitals to gain clinical experience. During the fall semester of 2022, she will be applying to in and out-of-state and international graduate school programs.

Jezzabella Jimenez

Mentor: Dr. Olga Griswold, Professor of English and Modern Languages

Title: Transitional Bilingual Education vs Dual Language Immersion: Students' views on their Preparedness for College.

Abstract: Over the past five decades, educational linguists have been keenly interested in the effects of Transitional Bilingual Education (TBE) and Dual Language Immersion (DLI) programs on the academic achievement and literacy skills of language-minority students. Early TBE has been shown to improve oral vocabulary and literacy development in the home language at no cost to English language and literacy development (Durán, 2014). Receiving academic instruction in their native language helps students develop both their academic abilities and English literacy (Cummins, 1976). DLI allows for language proficiency and academic achievement in both languages while also providing a cross-cultural understanding. Valdes (1997), however, questions the quality of DLI instruction, as she examines how language and power relate. Little research has documented how the two types of programs compare. Even less has been done to investigate the students' perspectives on TBE and DLI. The current study examines the relationship between these two modes of instruction through analyzing survey and interview data collected from current college students who participated in either TBE or DLI in K-12. My initial hypothesis is that students' experiences in the TBI or DLI program influence their perceptions of how well they are prepared for college-level studies. This is important for teaching and subsequent research, as we learn more about the similarities and differences between TBE and DLI. This study will help the public, educational institutions, and teachers in further improving TBE and DLI programs and in influencing the policies regarding bilingual

Bio: Jezzabella Jimenez is currently a senior at California State Polytechnic University - Pomona. Her area of study is Organizational Communication with a minor in Teaching English to Speakers of Other Languages. After graduation in Spring of 2022, Jezzabella plans to attend graduate school to obtain her Linguistics Ph.D. with her Masters in route. Her current research interests include bilingual education, effects of bilingual education on perceived preparedness for college, second language acquisition, speech patterns, identity, speech perceptions, language documentation and revitalization. Her long term goal is to become a professor in August of 2028. Jezzabella would like to give back to academia and future students as she has learned so much through her experience from community college to entering her doctoral

Vanessa Langarica
Mentor: Dr. Junjun Liu
Title: Disinfection Capabilities of Nanofiber Membrane Functionalized with Antimicrobial Peptide

Abstract: Contamination of drinking water is a major concern across the world with waterborne diseases being a major cause of death, especially in developing countries. Today the primary methods of water purification are energetically demanding and involve chemical additives, like chlorine and ozone, which have been shown to form dangerous byproducts harmful to both human health and the environment. Recent engineering has developed novel filter membranes functionalized with antimicrobial nanoparticles like silver and copper but as the field of nanotechnology advances, scientists continue to speculate on the potential hidden effects of exposure to these as well. Filtration devices constructed using biological material are a relatively new concept with the potential to be safer and more cost-effective alternatives to earlier methods of purification. This project is part of the larger aim by Dr. Farhana Abedin of the EMET Department at Cal Poly Pomona to produce a novel filter device using nanofiber functionalized with an affordable, naturally occurring, and non-toxic antibiotic peptide as a safer approach to sanitization. In this project, electrospun polystyrene nanofiber was used to establish an effective binding protocol for the immobilization of peptides onto the fiber to generate a functionalized filter membrane. Once an effective coupling protocol was established, the nanofiber was incubated with Staphylococcus aureus and Escherichia coli to determine whether the functionalized nanofiber exhibits significant activity against bacteria in comparison to unfunctionalized nanofiber. The peptide was effectively immobilized across the fiber but did not show significant inhibition or lysis of bacteria. Continuing work involves the incorporation of more potent peptides and future plans are to utilize protein detection techniques to confirm the stable attachment of antimicrobial peptides to the nanofiber.

Bio: I am a prospective biomedical researcher with a particular interest in Cancer and Diabetes Immunology. I would like to one day study in a professional setting the pathogenesis of cancer and autoimmune disease, especially within the context of potential relationships between hostmicrobe interactions and immunological disease. The opportunity to participate in hands-on research experience as not only improved my laboratory skills but also my ability study peer reviewed literature to stay informed and inquisitive, to take observations and turn them into investigations, and to communicate findings to both an academic and general public audience. With the support of my faculty mentor and the McNair Scholars program, I accomplished my undergraduate goal of presenting a research project at a conference. I plan to continue improving my knowledge and abilities with the aim of becoming a competent and competitive candidate for a position as a professional researcher or laboratory scientist.

Nicole Luna
Mentor: Dr. Brian Ramirez
Title: Elastic Mechanical Metamaterials for Energy Absorption

Abstract: Foams are commonly utilized to absorb energy in applications with impacts, but they have limited design parameters. Recent advances in 3D printing have enabled the manufacturing of more spatially tailored lattice structures with unique properties, often referred to as mechanical metamaterials. This project explores the energy absorption properties of two distinct lattice structures, one having a stretching dominant behavior, while the other exhibits a bending dominant behavior. The lattice structures were modeled using Solidworks and scaled to the same size and volume fraction. The stress-strain behavior of these lattices were then computationally obtained under quasi-static and dynamic compression using ANSYS, a finite element analysis software. From these results, we were able to determine the energy abortion characteristics of stretching and bending dominant lattice structures under varying rates of impact.

Bio: Nicole Luna is a fifth year undergraduate student at California State Polytechnic University, Pomona studying Physics and Mechanical Engineering. Her current research involves simulating impacts of viscoelastic mechanical metamaterials in ANSYS to explore the differences between buckling and non-buckling metamaterials. In Fall 2022 she will be starting a PhD program in experimental condensed matter physics, hopefully at a graduate school with snow. In graduate school she plans to research materials that improve the efficiency of solar energy with the goal of decreasing global climate change. In her free time, she enjoys reading, rock climbing, taking her dog on hikes, and running.

Natali Mendez

Mentor: Erik Froyen, Ph.D, Assistant Professor to the Department of Nutrition and Food Science

Title: A relationship between diet and exercise patterns on the consumption of protein supplements.

Abstract: Many people have shifted to a predominantly plant-based diet, and gym or a fitness lifestyle bringing along a consumer market growth of dietary and protein supplementation. A vegetarian diet and other restricted diets of animal protein sources are increasing in popularity also as studies center on the unlimited benefits of a plant-based diet. Nutrient deficiencies of protein, calcium, vitamin B-12, and iron are perceived to occur with these diets (Clarys, et al., 2014). Thus, the presumed necessity to buy any form of supplement exists.

The purpose of this study is to evaluate the exercise and dietary protein patterns that come from plants, animals, and protein supplements: powders (shakes), sport bars, and amino acid supplements, amongst CPP students. A 15-question survey was used to detect college student's diet, exercise, and protein supplementation patterns. Results revealed nonsignificant supplemental use among college students who exercised or followed a meat restricted diet. Finding no correlation between dietary protein and exercise patterns, and the use of supplemental protein can assist with future research on dietary behaviors or in designing future interventions aimed at enhancing nutrition education about protein (e.g. sources, function, and intake).

Bio: Natali Mendez (she/her) is a first-generation, senior student who is studying Nutrition, with an emphasis in Dietetics and minoring in Microbiology. Natali is actively involved on campus serving as the 2021-22 Estudiante de Dietetica Vice President, the Ag. Representative for the Food and Nutrition Forum, a Sally Cassanove recipient and a McNair Scholar. She also volunteers her free time serving as the Student Representative for the Academy of Nutrition and Dietetics Education Council and the Dietetic Intern at Westminster Free Clinic in Ventura County. Her current research focuses on finding a relationship between diet and exercise patterns on the consumption of protein supplements. After graduating from California Polytechnic State University, Pomona in Spring 2022, Natali hopes to begin a dietetic internship to earn her Registered Dietitian credential and then continue with a PhD program in Nutritional Sciences. Her career plans are to become a Registered Dietitian to work at an outpatient clinic while staying in academia as a professor. Her research interests include evidence-based education and practice, equitable nutrition, community-based interventions, and food behavior and choices.

Omar Mendez
Mentor: Tatiana Pumaccahua Ph.D, Assistant Professor
Title: Community-Cultural Wealth among first-generation BIPOC English Language Learners in higher education

Abstract: According to the U.S. Department of Education, English Language Learners (ELLs) are becoming an increasingly essential part of the K–12 school population. In the United States, one out of every five children now live in a family where a language other than, or in addition to English, is spoken. Although research has been conducted on how ELLs and linguistic minorities confront structural challenges and disadvantages, there have been limited studies that examine how they overcome these barriers. In particular, there is a paucity of research on the experiences of ELLs who identify as Black, Indigenous, and People of Color (BIPOC), as well as those who are first-generation college students. As such, the present pilot study qualitatively explored the academic experiences of first-generation ELL college students who self-identify as BIPOC. Moreover, this study examined the students' experiences through a Critical Race Theory (CRT) grounded strength-based approach. Specifically, the Community Cultural Wealth (CCW) model was selected to examine the lived experiences of these students as they navigate structural challenges in their college education through their aspirational, linguistic, familial, social, navigational, and resistant capitals. Preliminary findings and implications of the study will be discussed in this presentation. In particular, findings will provide crucial information on how first-generation BIPOC ELL students are utilizing their strengths, talents, and experiences (i.e., their capital) as students of color in institutions of higher learning. Research that is grounded on CRT and is strength-based is keenly needed for understanding, elevating, and supporting the success of these students in higher education.

Bio: Omar Mendez is a first-generation psychology student at California State Polytechnic University, Pomona, with a clinical practice emphasis. He serves as a research assistant in Cal Poly Pomona's Socioemotional research lab, as a peer mentor for the Male Success Initiative/Project SUCCESS, as a behavior interventionist for children with disabilities, and as an intern for the mental health department at Pomona Unified School District. Omar is also a member of Psi Chi and a Ronald E. McNair Scholar, where he is researching Community-Cultural Wealth among First-Generation BIPOC English Language Learners in Higher Education. He hopes to get his Ph.D. in school psychology and work as a bilingual school psychologist. In his spare time, he enjoys listening to music, traveling, and off-roading.

Diana Laura Morales Palma

Mentor: Dr. Jennifer M. Switkes, Mathematics Professor

Title: Efficiency of the Simplex Algorithm: the Transportation and Assignment Problem Case

Abstract: Operations research (O.R.) is an interdisciplinary field that has become part of the larger umbrella of analytics. An algorithm often used in O.R. to solve Linear Programming Problems (LPs) is the Simplex Algorithm, developed in 1947 by American mathematician George Dantzig, which provides optimal solutions for LPs. Although Dantzig proved Simplex was finite, its efficiency was questioned. Previous research exploring its efficiency has shown that problems can be carefully constructed to point Simplex towards a longer path (number of iterations) that results in behavior that is exponential in the size of the problem. Our goal is to analyze the behavior of Simplex when applied to Assignment problems. Does it follow nice behavior that is linear in the size of the problem or does it behave differently? The unique structure of Assignment problems allows us to explore the theoretical conversation of problem construction and modifications to Simplex. To set the ground work for our analysis we use MATLAB's Optimization toolbox to solve randomly generated Assignment problems of different dimensions. Once we have our Assignment Problem MATLAB program we can do the same for Transportation Problems. We then use MATLAB to extract the number of iterations Simplex takes to solve a problem and perform statistical analysis that reports the average number of iterations. Our analysis will then be used to guide our theoretical conversation on efficiency. In this talk we will present preliminary results of our data and statistical analysis on Assignment and Transportation Problems.

Bio: Diana Morales is a third year at Cal Poly Pomona where she is pursuing a dual degree in Applied Mathematics and Electrical Engineering. Her research interests lie in signal processing, optimization, algorithms, and other computational mathematics. This academic year she has been conducting research on the behavior of the Simplex Algorithm with Transportation and Assignment type problems through the McNair Scholars program. Diana plans to attend a Ph.D. program that explores optimization and computational mathematics. She strives to become an educator in higher education and help other first-generation students get involved in research. During the academic year, she is involved with EOP (Educational Opportunity Program) as a Learning Strategist. Previously Diana was a Mickey Leland Energy Fellow with Lawrence Livermore National Lab, an intern for the Big Data Services group at SoCalGas, and an intern for the Information Control Systems Division at the Hyperion Water Reclamation Plant.

Cristian Moreno-Vasquez
Mentor: Dr. Erika DeJonghe
Title: Associations Among Implicit Bias, Self Reported Attitudes, Hate Crime Sentencing Recommendations

Abstract: This study aims to examine attitudes towards transgender Asian people. COVID-19 pandemic has increased anti-Asian sentiment. Following the justification-suppression model, it was hypothesized that participants who may hold a prejudice may be more likely to express it following the increase of anti-Asian sentiment. It was further hypothesized that expression of either prejudice, bias, or both would be exacerbated when transphobia and racism were both present, placing transgender people who are Asian at increased risk. Data from a sample of 256 undergraduate participants were collected. Participants completed the Ambivalent Sexism Inventory (ASI), Transgender Attitudes and Beliefs Scale (TABS), an implicit association test (IAT) assessing implicit bias against transgender Asian people, one of four hate crime vignettes, and demographics. Higher scores on the measure of sexism were found to be associated with greater bias against transgender people; higher scores on TABS were associated with higher scores on the hostile sexism, $r(254) = .63, p < .001$, and benevolent sexism subscales of the ASI, $r(254) = .39, p < .001$. IAT D-scores were associated with overall ASI scores, $r(235) = -.27, p < .001$ and with Hostile sexism, $r(235) = -.33, p < .001$. D-scores were also associated with TABS, $r(235) = -.33, p < .001$. Additionally, results indicated that more conservative self-reported political ideology was associated with the greater bias against transgender Asian people on the IAT; D-scores were associated with political ideology, $r(234) = -.28, p < .001$. Political ideology was found to be associated with the ASI, $r(247) = .43, p < .001$, Hostile Sexism subscale, $r(247) = .51, p < .001$, Benevolent Sexism subscale, $r(247) = .21, p < .001$, and the TABS, $r(247) = .51, p < .001$. Greater levels of conservatism were associated with greater ambivalent sexism, hostile sexism, benevolent sexism, and bias against transgender people. Finally, the number of months suggested for sentences when a victim of a hate crime was described as a transgender Asian man was found to be lower when participants had higher scores on the ASI ($r(51) = -.41, p < .001$) and Hostile Sexism subscale ($r(51) = -.38, p < .001$).

Bio: Cristian Moreno-Vazquez is a fifth-year undergraduate at California State Polytechnic University, Pomona who is studying Psychology. Their current research concerns attitudes toward transgender Asian people. Utilizing measures to make associations about attitudes toward this intersection of gender identity and race. They have applied to various graduate school programs in hopes of obtaining a Ph.D. in Psychology. This degree will allow them to gain the skills necessary to help others through means of clinical work and research. Plans for their future research include continuing and expanding on the topic that currently encompasses their research. Understanding attitudes and biases against transgender and gender non-conforming populations.

Thelma Perez

Mentor: Dr. Giselle Navarro- Cruz, Assistant Professor of Early Childhood Studies in The College of Education and Integrative Studies
Title: Educational Disrupts and Online Teaching: Analysis of Preservice Educators Experiences with Education Preparation Programs During COVID-19

Abstract: COVID-19 school closures have interrupted education preparation programs which are dependent on schools to provide observation and internship experiences for aspiring education professionals. Preservice educators are the future of the education workforce and have faced limitations in valuable in-person classroom experiences that allow them the opportunity to interact with children and families, participate in planning and implementing lesson plans, and collaborate with mentor teachers in strengthening their professional skills. Educational disruptions have made it critical to strengthen preservice educators to adapt to the changes of educating young learners through both in-person and online models. The purpose of this study is to gain insights from aspiring education professionals on the impact of the COVID-19 pandemic on their experiences with teacher preparation and learn about their perspectives on self-efficacy and readiness to teach in-person and online. The focus of this study is to inform efforts to improve education preparation programs in preparing aspiring education professionals with the adequate resources and tools to successfully adapt to educational disruptions that may arise due to unprecedented circumstances.

Bio: Thelma Perez is a fourth year first-generation Latinx undergraduate transfer student at California State Polytechnic University, Pomona (CPP) majoring in Early Childhood Studies (ECS). Prior to transferring to CPP, she attended Chaffey College where she began her journey in ECS as an observation student at the children's center on-campus and became passionate about working with young children and families. Upon transferring to CPP, she obtained part-time employment at the CPP Children's Center, volunteers as a research assistant with the ECS department at CPP and is actively involved in leadership with clubs and organizations on-campus. Thelma hopes to continue her studies in pursuit of a Ph.D. in School Psychology. Her research interests include studying the needs of diverse children and families, promoting culturally and linguistically sensitive school-based practices, and investigating aspiring teachers' perspectives on their impact of COVID-19 on their teacher preparation.

Ryan Sandoval
Mentor: Dr. Jenny Zhen Yu
Title: Autonomous Flight of High-Endurance UAVs to Monitor Powerlines

Abstract: We are developing a network of fully autonomous drones to monitor powerlines while being able to recharge their batteries via magnetic inductance from power transmission lines. Powerline work is difficult and dangerous, and we are researching a way to make a drone that will provide a safe option for flying next to the powerlines. Autonomous flight is the act of a drone flying while being unmanned by a pilot. Our team, BASHEE UAV, is an interdisciplinary research group of the Aerospace and Electrical/Computer Engineering department. Our Electrical and Computer Engineering team develops the hardware for the 2-axis gimbal, the Ground Control Station, and induction coil ad the software to design python scripts to make the drone image recognize powerlines. Our future goals are to implement a 2-axis gimbal with an onboard camera to our drone to monitor powerlines and autonomous obstacles through image recognition while communicating to a 4G LTE network.

Bio: Ryan Sandoval is a third-year transfer undergraduate student at California State Polytechnic University, Pomona currently studying Computer Engineering. He is currently a member of the Cal Poly Pomona Kendo and Iaido Club, BANSHEE UAV Senior Project Research Group and the McNair Scholars Program. His current research revolves around autonomous flight of high endurance UAV's under the advisory of Dr. Jenny Zhen Yu and Professor Steve Dobbs. He plans to pursue a Ph.D. in Electrical Engineering and his future goals are involved in the work of designing autonomous drones.

Bryan Ramirez
Mentor: Dr. Frances Mercer
Title: Investigating the growth of different Tritichomonas foetus strains at different pHs.

Abstract: Tritrichomonas foetus is a unicellular flagellated protozoan parasite known to cause trichomoniasis in cattle. Trichomoniasis is a sexually transmitted disease known to affect the reproductive tract of cattle, resulting in abortion and reduced fertility. However, how the immune system combats trichomoniasis is under-characterized. In order to examine T. foetus and the immune response against it, we must first be able to cultivate it. T. foetus is most commonly grown in Diamonds media, however the optimal pH that each different strain grows in is unknown. In a literature search, we found that researchers typically grew T. foetus in a pH of 7.2. Trichomonas vaginalis, a similar parasite known to cause trichomoniasis in humans, is grown at a pH of 6.2. Meanwhile, no modification to the Diamonds media will result in a pH of 6.8. Therefore, we hypothesize that modification of Diamonds growth media to a pH of 7.2 will result in a greater cell count and viability, in comparison to pH 6.2 and 6.8. We will grow four different strains of T. foetus in Diamonds media at pHs of 6.2, 6.8 and 7.2, and compare the growth of these parasites over 5 consecutive days. The concentration of T. foetus will be determined via microscope using the hemocytometer and by flow cytometry. Data for the strains KV-1 and BP-4 indicate a preference for more basic media, pH 6.8 and 7.2. Overall, these results will help determine the optimal pH modification to grow viable T. foetus cultures, which will help expand future T. foetus research.

Bio: Bryan Ramirez is a fourth-year undergraduate student at California State Polytechnic University, Pomona. Majoring in biotechnology with a minor in chemistry, he plans to obtain a PhD in immunology in the near future. He was first introduced to the possibility of performing research through his SEES mentor, who similar to him was also a first generation Latine student. As part of the Mercer lab, Bryan's research involves the cultivation of Tritrichomonas foetus, a parasite that they work with in the lab, and investigating its growth at different pHs. He plans to obtain a PhD in immunology, where he can continue performing research to help towards the development of new therapeutics and treatments, to treat infectious diseases. He also hopes to become a mentor for other students from underrepresented communities, as well as aiding efforts to increase the diversity in the field.

Henry Sanchez

Mentor: Claire Wong, Ph.D.

Title: Drivers of the adoption intention of 3D simulated software in the Apparel Industry: Quantitative Approach

Abstract: 3D rendering software for apparel helps garment firms and manufacturers throughout the globe to overcome productivity constraints, accelerate time to market, and improve sustainability standards by using 3D modeling and rendering. The incorporation of such digital software into the apparel industry has enabled technical and industrial progress in comparison to previous methods of garment, textile, and manufactured manufacturing production. However, not all apparel firms have been successful in implementing the software solution. Individuals' potential for adoption is influenced by the perceived depiction of difficulty or the stage at which software passes through a population. Following Technological Acceptance Model (TAM) and Innovation Diffusion Theory (IDT), this research aims to identify the obstacles that prevent or promote individuals from embracing 3D simulation software in the apparel industry, with the goal of making it simpler for users to adopt. An online survey was conducted to collect data. Those with experience with using 3D rendering software were recruited for this study. All measurements were adapted from the previous studies. The results of this study provide implications for practitioners who are interested in utilizing 3D apparel software as a part of their business.

Bio: Henry Sanchez is a senior studying Apparel Production and International Business at California State Polytechnical University, Pomona. Previously, he studied at Santa Ana College and worked as a teacher aide in order to get roles in the apparel industry linked to bridal construction and design. Apart from being active in his industry, he has nine years of retail experience and is presently a purchasing buyer at a small startup, where he negotiates with clothes manufacturers to acquire excess products from huge organizations such as Nordstrom, Target, QVC, and so on. He intends to graduate in the spring of 2022 and is enthusiastic about learning and experiencing new things that will help him in his career and in life. As a result, he continues his study by applying for higher education in Apparel Design. His focus is in holistic design, which looks at the big picture of making items that can survive beyond the season, since diverse design aspects are put in place to consider endurance. Furthermore, he is enthusiastic with 3D simulation software, owing to its effectiveness and ability to detect and rectify errors throughout the development process. Long term plans adhere to continue as technological pioneer in the sectors of both 3D and apparel design. Overall, relying on a solid academic foundation and intending to solve gaps in the apparel industry in design and production of clothing.

Tristian Scharfenstein- Montgomery
Mentor: Dr. Tauhidur Rashman
Title: Recovery from a Firmware Attack on Drones

Abstract: The use of drones is increasing every day. The ability of drones to provide live-stream, real-time video and image capture, along with the ability to fly and transport goods makes them lucrative for commercial and private use. However, drones are vulnerable to various attacks due to their reliance on wireless communications. Such attacks can have drastic effects, especially to commercial and private users. In this context, there is a lack of proper understanding on how hackers perform their attacks and hijack a drone, to intercept it or even crash it. In fact, drones can also be compromised for malicious purposes. Hence, there is a need to detect them and prevent them from causing any damage. This paper will provide a deeper understanding of one of the ways a hacker can detect drone communication between the user and the drone. Then it can remotely take control of a drone via a different user. It will then have different solutions to prevent the hacker from controlling the drone and what to do in the case a hacker is successful in taking it over.

Bio: Tristan Scharfenstein-Montgomery is a fourth year undergraduate at California State Polytechnic University, Pomona who is studying Computer Engineering. He is passionate about education, mentorship, technological advances in artificial intelligence and autonomous vehicles. His current research is in drone security and figuring out ways in which an attacker might attack a drone and how to prevent this attack. He plans on using his research to protect companies and private users property and information from hackers. He hopes to train computers using a machine learning algorithm to look out for signs in which an attacker would take over a drone. He plans to pursue his Ph.D. in AI where he can gain the tools needed to benefit his community through professorship, research, and service. At the end of spring semester of 2022, he'll be graduating from undergraduate and pursue his Ph.D. in fall semester of 2022.

Diana Solis

Mentor: Dr. Shayda Kafai

Title: Healing Circles in Academia: Creating Radical Self-Care

Abstract: Having Healing Circles as a tool not only aided me in coping with racism, microaggressions, sexism, imposter syndrome, and my mental health within academia, but they have also gifted me with empowerment and a sense of identity as a Xicana. My research on Healing Circles focuses on intersectionality, decoloniality, and feminism of color resistance and pedagogy. Healing Circles offer a framework of radical, transformative healing tools, particularly for BIPOC non-binary womxn. They offer an intervention to institutional disembodiment. Feminist of color scholars, including Stephanie Cariaga, discuss how institutional disembodiment creates more trauma by forcing a violent separation between the mind and body of students and educators. Most scholars write about healing circles as community-centered practice and as an alternative way to decolonize health care. This paper argues that Healing Circles can be used as a tool in academia to help heal faculty and students in Ethnic Studies. There is an imbalance in Ethnic Studies between learning about oppression and learning about resistance, what feminist Queer Chicana Scholar, Gloria Anzaldua calls the dark versus the light, respectively. My research question is designed to answer how to focus more on the "light" as a way of healing, especially in Ethnic Studies. The methods I plan to use are Participant Action Research, semi-formal interviews, and Healing-Centered Engagement Theory. Anticipated results are that students and educators reclaim their healing. Since there are few to no Healing Circles in academia, after doing this project I hope to develop a workshop series for CSU institutions outside of Cal Poly. Since they now have Ethnic Studies as a graduation requirement.

Bio: Diana Solis is a transfer undergraduate at California State Polytechnic University, Pomona who majors in Gender, Ethnicity, & Multicultural Studies with an emphasis on Chicana/o Latina/o Studies. She previously studied and received her Associates Degree in Chicana/o Studies at RIO Hondo College. Currently, she is working at the Office of Student Conduct and Integrity as a student assistant. She is an avid runner and has run 3 marathons! Her research explores how Healing Circles can be used as a tool in academia to help heal faculty and students of color in Ethnic Studies courses. Her research explores how Healing Circles can be used as a tool in academia to help heal faculty and students of color in Ethnic Studies courses. Her short term plans include completing her IRB study, graduate in Spring and apply to grad school. Her long term plans include working towards getting her PhD in the Ethnic Studies and working towards becoming a published theorista and professora.

Jesus Vargas

Mentor: Dr. Helen Trejo

Title: Evaluating the Mechanical Properties of Twill Woven Cotton Materials: Textile Waste and Upcycling for Increased Sustainability

Abstract: Recycling is a key theme within an emerging segment of the apparel industry. According to the Environmental Protection Agency, the U.S. apparel and footwear textile waste generation in 2018 totaled 17 million tons. However, only 6.77% of these materials were recycled and/or reclaimed. With contemporary consumption patterns, there is a cascading effect on pre-and post-consumer textile waste. The process of reclaiming apparel and textiles for recycling has set a multitude of industry players to emerge as a segment that diverts textile waste from landfills for redistribution. Current studies have explored sustainable fashion interest but have not evaluated the quality of textiles for upcycling from a mechanical or functional perspective. This study engages with the current textile recycling industry by sourcing and analyzing cotton twill textiles, which are commonly manufactured and are the most versatile for a broad range of products. The literature review discusses research regarding consumption, textile waste, recycling efforts, textile quality, and material performance. Due to the lack of textile recycling generation, this study contributes to the conversation of upcycling as an increased method of sustainability. This study involves sourcing post-consumer textile waste, mechanical textile testing, and specifying recommendations for product development based on test performance. A full experimental study was conducted on three post-consumer cotton twill textile products and a standardized version of cotton twill by evaluating tensile strength, abrasion resistance, and pilling resistance based on ASTM standards. With the abundance of textile waste entering landfills, this study aims to expand knowledge upon the prospective performance of these textiles to further inform high-quality upcycling for product development.

Bio: Jesus J. Vargas is a third-year undergraduate student and researcher at California State Polytechnic University, Pomona, and is studying Apparel Production and Textiles. His educational journey started in Los Angeles, attending Santa Monica Community College. Earning an Associate Degree in Honors General Science. During college, he began to view apparel as a form of change and expression through textiles, production, and design. He soon began pursuing his creative endeavors in search of a greater truth about the apparel industry. His early engagement has gained him an upper hand in acknowledging apparel construction incongruence to textiles, design, fit, sourcing, and production. He plans to receive a bachelor's degree of Science in Apparel Textiles to further explore the locomotion's of the apparel landscape and understand the expanding apparel market. His current research explores the mechanical relations between textile waste and upcycling as an increased method for sustainable product development. He plans to apply to graduate school programs starting Fall 2022 to achieve research in textile technology and apparel innovation.