2020–2021
Research Gateway Scholars Program

Summer Research Institute Symposium

JULY 22, 2021
UNIVERSITY OF SOUTHERN CALIFORNIA
Symposium Program
- July 22, 2021 -

9:30 AM  
*Drs. Andrew McConnell Stott & David Glasgow*  
Welcome & Introductory Remarks

9:40 AM  
*Victor Perez*  
Speech Perception with Temporally Patterned Noise Maskers | Dr. Zevin

10:05 AM  
*Maria Jose Gonzalez*  
Examining Adolescent Wellbeing, Social Connectedness, and Purpose in Life Through Youth Programming that Promotes Narrative Meaning-Making | Dr. Immordino-Yang

10:30 AM  
*Leonardo Bautista*  
Critical Raw Materials in China and Influence Over Solar Technology Development | Dr. Sanders

10:55 AM  
*Anijah Lezama*  
Charts of Endless Knowledge: Astrology effectiveness on millennial and Gen Z decision making | Dr. Zeamer

11:20 AM  
*Lunch Break*

11:40 AM  
*Breece Phipps*  
The Navigation and Control of Multiple Satellites in Formation | Dr. Ronney

12:05 PM  
*Ashley Perez*  
Perceived Empathy of Socially Assistive Robots | Dr. Matarić

12:30 PM  
*Jasmin Sanchez*  
Program Development; Child Retention and Application of the Social Emotional Learning Strategies Taught by SOLA Peace Camp | Dr. Payne

12:55 PM  
*Drs. David Glasgow & Hugo Burbano*  
Closing Remarks
**Major:**
Neuroscience & Psychology

**Faculty Advisor:**
Dr. Jason Zevin

**Title:**
Speech Perception with Temporally Patterned Noise Maskers

**Abstract:**
Speech perception often occurs in the context of adverse listening conditions (sounds of traffic, windy conditions, people having conversations, etc.) which mask the target stimulus of speech. Prior research examined the two types of masks, energetic (e.g. white noise) and informational (e.g. other speakers) with paradigms that are distinct in various dimensions. Since the paradigms for each mask vary so much, direct comparisons between energetic and informational masks are difficult to make. We created a mask that uses temporally regular silences over what would otherwise be an energetic mask, allowing for a single dimension of difference between energetic and informational masks. Participants were recruited for pilot data as a favor to the experimenter and completed the task online in which they had to identify words in either a local repetition, global repetition, or regular energetic mask. Performance on word identification per condition was analyzed with a linear mixed effects model. Over the course of multiple studies we have gathered a lot of evidence for a complicated effect. The findings of this paper can lead to exploration of a new field in understanding how masking can be affected by temporal patterning.
Major:
Psychology & Chicano Studies

Faculty Advisor:
Dr. Mary Helen Immordino-Yang

Title:
Examining Adolescent Wellbeing, Social Connectedness, and Purpose in Life Through Youth Programming that Promotes Narrative Meaning-Making

Abstract:
Adolescence is a time of developmental challenges in which youth start making sense of past experiences, present context, and futures. This skill—called narrative meaning-making—is developed during adolescence and allows individuals to elaborate and learn from their experiences. Identifying measures to enhance healthy meaning-making and enhance psychosocial development during this challenging stage is necessary. However, prior research has not examined narrative meaning-making in the context of intergenerational youth programming for improving adolescents’ psychosocial development; nor does this research engage low-income populations. Ongoing research suggests that Sages & Seekers—an 8-week youth program promoting narrative meaning-making—may enhance psychosocial development and increase wellbeing among adolescents (ages 14-18). Through this program, adolescents (i.e. Seekers) are paired with an elder (i.e. Sage) to meet for weekly conversations. The program culminates with adolescents engaging in narrative meaning-making by writing and sharing their experience in the program (i.e. Tribute) to their sage. The present study examines whether the outcomes of Sages & Seekers can be related to the meaning-making adolescents (n = 57) from low-income backgrounds. To begin, we developed a coding scheme to measure meaning-making and explore whether abstract ways of thinking and abstract complex emotions can support learning. Preliminary findings showed that reflections of Learning in the form of Growth Over Time correlate with mentions of Abstract Emotions in the Tributes ($r(55) = .266, p = .045$), particularly Motivation ($r(55) = .313, p = .018$). Similarly, learning in the form of Extraction of Values correlate with Abstract Emotions ($r(55) = .299, p = .024$). Next, we will explore how pre- and post-intervention changes in self-reported well-being and social connectedness relate to adolescents’ meaning-making in their tributes. We hypothesize that the strategies of meaning-making used and their frequency will predict the extent to which adolescents benefit from Sages & Seekers. If this is the case, we will gain more knowledge on how to promote healthy meaning-making among low-income adolescents to enhance their psychosocial development.
LEONARDO BAUTISTA

Major:
Environmental Engineering

Faculty Advisor:
Dr. Kelly Sanders

Title:
Critical Raw Materials in China and Influence Over Solar Technology Development

Abstract:
In the coming decades, solar energy will be among one of the renewable technologies in high demand to replace fossil fuels to mitigate climate change. However, China has significant control over many of the critical raw materials required to create solar technologies and the assembly of many of the world’s solar photovoltaics, which has raised concerns over how sustainable solar technologies will be as demand increases in the future. China has strict policies that prevent outside countries from accessing their resources and utilizes poor production and refining practices that make solar development less sustainable. This research project will analyze the sustainability of solar technology supply chains controlled by China based on various environmental and social sustainability criteria. The research will be conducted by compiling a literature review based on peer-reviewed manuscripts, white papers and technical reports, and news articles to compare China’s production techniques with other countries. These sources will be used to perform a comprehensive analysis of the sustainability of solar energy technologies and China’s impact on the solar technology supply chains of other countries. There is potential that solar energy development would prove to be unsustainable. After analysis, it is found that China’s material production for solar energy is less sustainable compared to other countries’ production processes. Given that China produces much of the world’s solar energy systems, especially considering their use of forced labor and coal use for material extraction, processing, and component manufacturing, solar energy is generally unsustainable. Since most other countries are affected by China’s manufacturing practices through the export of raw materials and components, countries receiving China’s resources are also affected by China’s practices.
ANIJAH LEZAMA

Major:
Dance, Cultural Diplomacy (minor)

Faculty Advisor:
Dr. Emily Zeamer

Title:
Charts of Endless Knowledge: Astrology effectiveness on millennial and Gen Z decision making

Abstract:
Millennials and Gen Z who seek advice from astrology often find that what they are told can seem true, because these pieces of information provide reasoning to things they don’t understand. Their minds seek to make sense of information that, in themselves, are general and therefore it becomes difficult to prove what is in their control and not. Many millennials and Gen Z struggle with self esteem, self-worth and advanced decision making skills, and these issues are projected to become increasingly worse in the near future. This research will serve to analyze how social media platforms such as Snapchat and Tik Tok play a role in the attraction of astrology and how Millennials and Gen Z are using it to understand themselves and their choices. Furthermore, the familiar astrological term “Mercury in Retrograde” has been used to acknowledge societal changes within relationships and professional life. Astrological compatibility and daily horoscope constitute a strategy for supporting these issues short term but not so much long-term (Fullscreen, 2019). Along with research, the paper will reflect a literature-rich review of the validity of astrology as a heuristic tool (Hamilton, 2014) and if astrology might be linked to personality factors measured by the Big Five personality traits (Burke, 2012). The Big Five personality test is a statistical study of test responses to personality items and ultimately based on the answers test takers are defined by the following traits: extraversion, neuroticism, agreeableness, conscientiousness and openness to experience (Burke, 2012). This paper also focuses on research conducted on a set of 49 college students done to their acceptance of trivial statements by definition of the Barnum Effect, as having a connection to an “external locus of control” and “a lower self-esteem” (Brown, R. L. et al, 2015). Furthermore, connecting this proposed hypothesis by analyzing the participants of a British study done that tests the prevalence of astrology in popular culture due to three possible hypotheses: the attraction of astrology due to lack of scientific knowledge, astrology as a implication of “metaphysical unrest” found in those with little religious orientation and the belief in astrology among those with a “authoritarian character” (Bauer 1997). The results of the findings indicate that horoscope predictions are seemingly accurate to millennials and Gen Z because they mimic cyclic traditions and patterns but are not valid because there’s no factual evidence that links birth date and experiences. The cultural reification of astrology provides the case that horoscopes predict personality and behavior which prove that they have no correlation with big five personality traits and support the hypothesis that lack of scientific knowledge and little religious orientation can support astrological beliefs. Which is in part due to low self-esteem and an external locus of control. These findings support the hypothesis that while horoscope predictions might give the appearance of aiding Gen Z and millennials in short term situations in which they can make decisions or reflect on themselves, they may be unrealistic and inaccurate. Knowledge of negative effects of reliance on horoscopes and astrology may not be found but serve to demonstrate that Gen Z and millennials find comfort in using astrology to eliminate the intimidation that adulthood brings.
BREECE PHIPPS

**Major:** Astronautical Engineering

**Faculty Advisor:** Dr. Paul Ronney

**Title:** The Navigation and Control of Multiple Satellites in Formation

**Abstract:**
Satellite Formation Flying (SFF) is changing the way the aerospace industry conducts autonomous science missions. This rising technology will provide new and innovative ways for space entities to obtain scientific information and share this information between spacecraft and ground communications while accelerating human exploration. However, many hurdles need to be defeated to legitimize the transfer of this technology to space. Specifically, maintaining navigation and control through attitude, velocity, and position within a cluster of satellites will need to be addressed to execute commands based on the required formation. This current research looks to contribute to the current knowledge of SFF by investigating radio frequency (RF) navigation systems to acquire accurate measurements. Radio Frequency (RF) models for satellite formation flying in Low Earth Orbit (LEO) are developed by incorporating the Earth's oblateness and mitigating perturbation into fundamental equations that improve the navigation and control of satellites. Using two specific variables, the elevation and azimuth of each satellite relative to one another, a model can be assessed using the Clohessy Wiltshire Model. These models were tested using MATLAB to enhance the position of each satellite relative to one another. Each trial was then conducted at various distances to gather the rate of error accumulated. To visually assess the MATLAB models, the code was implemented into Satellite Tool Kit (STK) and applied to comprehend the system visually. Once SFF is fully developed, it will culminate in clusters of spacecraft flying and gathering significantly more data than ever possible before. In addition, formation flying will enable differential Global Positioning System (GPS) technology and innovative spacecraft autonomy techniques.
ASHLEY PEREZ

Major: Computer Science - Games, Game Animation (minor)

Faculty Advisor: Dr. Maja Matarić

Title: Perceived Empathy of Socially Assistive Robots

Abstract: Communicating empathy is a difficult skill for socially assistive robots. Work developing computational models of empathy has been growing rapidly, demonstrating the importance for machines to learn this skill. Despite this, questions remain about how beliefs in robot agency may mediate perceptions of robot empathy. Do people really believe that robots can feel emotions? Building a relationship between robot and user is important to the field of Human-Robot Interaction (HRI), especially in the context of healthcare. A robot’s failure to be perceived as empathetic by its human user could be detrimental to the human-robot relationship. This work studies the difference in viewer’s perceptions of cognitive and affective empathetic statements made by a robot in response to a disclosure. In this within-subjects study, participants (n=200) watch videos in which a robot responds to a human who is disclosing negative emotions around COVID-19, with either affective or cognitive empathetic responses. Using an adapted version of the RoPE Scale, participants will rate the robot’s perceived empathy in both cases. We hypothesize that the cognitive statements made by the robot will be perceived as more believable and more empathetic. We will translate these findings towards the creation of an autonomous facilitator robot for support groups.
Major:
Health & Human Sciences, Occupational Science (minor)

Faculty Advisor:
Dr. Kristy Payne

Title:
Program Development, Child Retention and Application of the Social Emotional Learning Strategies Taught by SOLA Peace Camp

Abstract:
Being a South Los Angeles resident brings an undeniable set of stigmas. The negative representation of the community as violent and crime infested generates the various inequalities and severe discrimination. This is not easy for any of the residents, it can impact their emotional, physical, and mental health. Some people acknowledge the detrimental effects and have decided to start a prevention program called the South Los Angeles Peace Camp, which opens its doors to children of the community ages 5–17 to teach them social emotional learning strategies they can use to combat the stigmas and the detrimental effects. To assess the program’s impact and development I interviewed 4 different parents with questions following the program’s curriculum which focuses on LAFTER: Listening, Asking questions, Feeling communication, Try for a win win, Error acceptance, making it Right in addition to social justice and mindfulness. The interviews gave us insight on the campers' retention of the lessons and the application of the strategies at home. In my preliminary analysis of the data Peace Camp became a community ground for the campers and the parents even in a pandemic. It created a space for campers to socialize and discuss their emotions during difficulties. The recurring theme from the interviews showed all campers retained the coping strategies and information discussed in camp but not all applied them. Peace camp works closely with many occupational therapists to teach the social emotional learning strategies children in the community can benefit from. They want their campers to unite and work against the stigmas to break barriers together as a community. Though the program needs to work on how many of their campers apply the camp’s strategies, future investigation can help the program expand and show the importance of integrating social emotional learning in the education system.
**Special Thanks**

**USC RGSP Staff:**
Dr. David Glasgow  
Dr. Hugo Burbano  
Dr. Alisa Sanchez  
Sarah Oh

**USC RGSP Mentors:**
Dr. Bo Jin  
Sophia Cardenas  
Cassandra Flores–Montano

**Faculty Advisors:**
Dr. Kelly Sanders  
Dr. Maja Matarić  
Dr. Paul Ronney  
Dr. Kristy Payne  
Dr. Jason Zevin  
Dr. Emily Zeamer  
Dr. Mary Helen Immordino–Yang

**USC Graduate School:**
Kate Tegmeyer

**USC Ph.D. Admissions:**
Dr. Andrea Hodge  
Dr. Amber Bennett  
Dr. Shawn C. Roll

**USC McNair Scholars:**
Ignacio Cruz  
Steven Proudfoot  
Azeb Madebo

**USC Kortschak Center:**
Dr. Rashelle Nagata

**USC Office of Pre–Grad Advising:**
Nicole Srednick  
Katherine Hanna  
Lisa Perkins  
Rachel You

**USC Dornsife Career Pathways:**
Octavio Avila  
Caroline Fraissinet  
Cynthia Kossan

**USC Career Center:**
Rhiann Joshua

Thank you scholars, presenters, faculty advisors, graduate mentors, and RGSP staff for making the 2021 Summer Research Institute a huge success!