

GRADUATE STUDENT ABSTRACTS

Making Stewardship First: Community Collaboration in Collections Management Policy

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Since the 1970's, collaborative efforts within the museum and source communities have increased. Following the 1990 passage of the Native American Graves and Repatriation Act (NAGPRA) and the subsequent passage of CalNAGPRA in 2001 in California, collaboration became increasingly necessary and significant. These laws mandated that Native American Tribes be consulted to repatriate ancestral remains and cultural belongings held in museum collections. A literature review of collaborative efforts within the museum community revealed a pervasive gap that exists in practice. Collaboration exists in some form through NAGPRA and CalNAGPRA and partnerships in museum exhibits, but hardly reaches the care and management of museum collections. This may be due to the implicit fact that collections are viewed as property, which makes collection management fundamentally about ownership. Collaboration in the collection thus means that there is an understood relinquishment of ownership. In 2023, the Office of Tribal Relations (OTR) was gifted an extensive collection of contemporary Native American and indigenous art representing artists across the Americas. OTR wants to provide access to Native Americans and educators so that they may interact with and learn from the collection. The Museum of Anthropology (MOA) and OTR are collaborating to support these goals as we are already invested in education and outreach, as well as a museum studies program. However, there is no existing policy to describe and facilitate this type of collaborative endeavor between OTR and the MOA or the care and stewardship of this community-focused collection. A re-

view and analysis of existing policy and literature will guide our research and methods. In helping to build a collaborative collections policy that brings in both the MOA and OTR, we are able to develop language that will facilitate partnership. We anticipate a Collection Policy for OTR be completed by Spring 2024. Having a written policy will help future researchers and collections managers in the CSU system have language and policies they can draw from as they look to build collaboration into collections. The policy will also help to provide insight into California Native American history and the importance of policies to be in place.

Pilot Study: Time and Temperature to Eliminate Foliar Fungal Endophytes

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Foliar fungal endophytes (FFE) are fungi that reside within the leaves of plants without causing any visible symptoms or signs of disease. These foliar communities exhibit remarkable diversity, with potentially hundreds of different fungal species coexisting within a single host. While some of these fungi have been shown to play crucial roles in plant defense mechanisms and adaptation to stressful environments, the functions of many others remain unclear. It is assumed that some fungi are involved in the decomposition of leaf litter once leaves have abscised. Understanding community assembly processes associated with the colonization of leaves after abscission and the influence of FFE on the colonization of decay fungi is critical for a greater understanding of carbon cycling. The community composition of ecological communities is influenced by stochastic and deterministic community assembly processes (e.g., priority effects). Focusing on fungal communities from green leaves through the decomposition process by investigating their roles

in leaf litter decomposition and effects on the carbon cycle at Big Chico Creek Ecological Reserve (BCCER), this study contributes to a deeper understanding of ecosystem dynamics. The findings can illuminate how FFE shape leaf litter communities, impact nutrient cycling, and influence carbon sequestration. By tracking the temporal changes in fungal communities, it offers insights into ecological succession and adaptation within ecosystems, enhancing our broader knowledge of microbial ecology and ecosystem function. The pilot project determines the optimal combination of temperature and duration required to sterilize *Quercus lobata* leaves obtained from BCCER. While various methods, such as gamma radiation and X-ray, have been used to remove microbes from internal tissues, there were no facilities nearby Chico to employ these methods. Therefore, we utilized autoclave heat and pressure, being aware that high heat could potentially negatively impact leaf biochemistry. We successfully identified the lowest temperature of 75°C and a time of 15 minutes as the combination necessary to completely eliminate FFE. The findings from this project will provide valuable insights for the methodology of a subsequent field experiment designed to investigate the roles of FFE in the decomposition of leaf litter and ultimately their influence on the carbon cycle.

Toward a Characterization of the Metric Dimension of Barabasi-Albert Random Graphs

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A graph consists of a set of nodes V and a set of edges E connecting nodes in V . Given a graph $G=(V, E)$, a subset of nodes $R \subseteq V$ is called resolving if all nodes in the graph can be uniquely identified based on their distances to the nodes in R . The metric dimension of a graph is the minimum number of nodes required to form a resolving set. Intuitively, this

concept is similar to the idea underlying GPS, where distances to three satellites are enough to identify any point on Earth. Metric dimension has several real-world applications, including source localization and providing low-dimensional feature vectors for machine learning.

Barabási-Albert random graphs share many characteristics with real-world networks, including the number of connections between nodes and the number of so-called “hub” nodes. This model’s preferential attachment exemplifies the “rich-get-richer” phenomenon observed in many real-world networks.

The metric dimension of various kinds of random graphs has not been studied thoroughly. This work set out to better understand metric dimension on Barabási-Albert random graphs. This can provide better understanding of real-world applications of metric dimension, such as representing genetic sequence data from DNA for biological research. Computational and experimental methods were used to analyze the size of resolving sets in relation to graph parameters. The Information Content Heuristic approximation algorithm was used to obtain small resolving sets for various graph parameters. This data appeared to show phase transitions in metric dimension as the total number of edges increased. A change-point detection algorithm highlighted the locations of these phase transitions. Various measures of node importance, called centrality measures, were investigated for the elements of resolving sets. As the total number of edges in these graphs increased, the standard deviations of the centrality measures seemed to approach zero. This suggests that nodes in resolving sets are basically the same in terms of centrality when the number of edges passes a certain point.

Future work includes applying more analytical and probabilistic approaches to determine an upper bound for the metric dimension with high probability and identifying the precise locations of relevant phase transitions.

Unveiling Gender Roles and Identity in Chico's Founding: Exposing Women's Leadership in its Prosperity through the Turn of the Twentieth Century

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History has often been written from the perspective of the dominant or powerful groups, leading to the erasure of the experiences and contributions of marginalized communities. Examining the founding of Chico, California, through the recovered voices of leading women creates a more inclusive and accurate understanding of the past. This project focuses on the lives of these influential women of Chico—Annie Bidwell, Ardenia Boydston Morehead, Emma Wilson, and Ella Gatchell—through its settlement to the turn of the twentieth century, shedding light on their roles, contributions, and the evolving dynamics of gender within the context of a developing frontier community. Through a case study approach, this project followed the lives of these four women by tracing their connections to one another and looking at the primary sources they left behind. This project traces their business, social, and familial networks by examining various newspaper articles, business records, deeds, club rosters, property maps, and other sources. Because Chico primarily attracted settlers with its agricultural potential rather than as a Gold Rush hotspot, it possessed a more balanced gender ratio. That demographic reality, alongside Chico's frontier nature, offered opportunities for women to defy gender expectations and harness their agency. These four women were all similar in that they were white women who held esteemed positions within the community. Still, besides that, they all brought something different to the enrichment of Chico and illuminated trends from the time. All four of them served as community leaders, working as philanthropists, entrepreneurs, educators, and doctors. Their contributions encompassed various aspects of community development, social initiatives, education, and cultural enrichment.

The women from this project, along with other women in Chico's past, played vital roles in shaping the town's character that continues to endure today, whether through brick and mortar, like Hotel Diamond, or through the sense of community at the city's core. This study offers the opportunity for continued research of other minority groups of Chico's past, such as women of color, whose impact and contribution are less known due to the marginalization of their voices.

Public Management and Monitoring Systems for the Integration of Commercial Cannabis Operations in Local Government

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About 56 percent of cities across the state of California have no system of public administration to monitor cannabis operations within their jurisdiction. There are significant efforts by the Department of Cannabis Control through grant funding systems to encourage local governments to develop a legal framework to open permit system that help increase access to legal cannabis operations. The cannabis industry is evolving differently across every city and county in the state. To develop administration systems that are efficient throughout the different regions and adhere to market demands across the state, this paper assesses the obstacles to building a healthy environment for a safe commercial cannabis industry. The main obstacles identified by policy makers and entrepreneurs in the industry demonstrate the challenges to the integration of the industry. The obstacles are the following: (1) multijurisdictional authority; (2) operational market structure; (3) taxation regimes; and (4) black market operators. To develop a monitoring system that efficiently incorporates commercial cannabis onto the local and regional governments, this study incorporates quantitative and qualitative data retrieved from local government officials, and managers in the private industry. Exploring the

data to analyze the obstacles can help identify what components of the industry are important for incorporating into the administration of the permit system. The permit system is the foundational instrument of administration to develop monitoring systems that can more efficiently integrate local and regional operators into the legal market. Implementing systems of operational design found within general system theory, the research seeks to demonstrate that cannabis as a product is transitioned from a product in the black market to state monitoring product. The successful integration of the product is based on the development of permit systems that encourage collaborative practices that include local and regional operators to construct community development practices that will strengthen relationships between regional operators and public administrators.

Determining the Impact of Adolescence Stress on the Oxytocin System

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Uncovering factors that influence the vulnerability of adolescents to stress is imperative to improving treatment strategies. This is vital since adolescents, particularly those with stress related mental illnesses, are more likely to develop substance use disorders. These disorders are often concomitant with stress-related psychiatric illnesses that disproportionately impact adolescents. Preliminary data (n= 39) has shown an increase in morphine reward in stressed female mice compared to non-stressed mice, with one dose of morphine (20mg/kg). With two exposures to morphine, males (stress and non-stressed) show a significant preference to morphine compared to females. Female mice do not show preference for morphine reward after a second exposure. The present study aims to examine the role of stress experienced in adolescence on opioid reward and dependence and oxytocin activity in adolescent male and

female mice. Utilizing immunohistochemistry, we will examine levels of the neuropeptide oxytocin and the immediate early gene c-Fos, in stressed and non-stressed mice. Stress has been shown to dysregulate oxytocin signaling. In rodents, stress has been shown to increase neuronal activity in the amygdala (AMY), locus coeruleus and prefrontal cortex. Some studies have demonstrated the effectiveness of oxytocin in treating drug response in humans and rodents by lowering craving and cue-response. Particularly, higher levels of oxytocin neuronal activity in the nucleus accumbens (NAcc) are associated with a decrease in drug reward. Furthermore, higher levels of oxytocin in the bed nucleus of the stria terminalis (BNST) have been associated with higher stress levels, particularly in females. C-Fos reactivity is a biomarker used to identify stimuli-induced changes in brain activity. Consequently, c-Fos in stress and reward related regions can illuminate neurobiological changes caused by stress and opioid use in the adolescent brain. We predict that higher activity in the AMY, NAcc, and BNST after stress will be associated with higher drug response. We predict that stress will increase opioid reward and dependence in male but not female mice. The results of this project are of clinical importance because they may inform research and new treatment strategies for adolescent mental illness and substance use.

The Intersection of Culture, Developmental Stages, and Mental Health Among Mexican American Young Adults in Rural and Urban Communities

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The children of Mexican immigrants living in the United States, have shown to have a more difficult time developing a sense of cultural identity due to the possible familial pressures of preserving Mexican cultural identity and societal pressures to assimilate into the dominant

cultural identity. This disturbance in identity could lead to individuals developing symptoms of mental health disorders, including borderline personality disorder and maladaptive behaviors (Jørgensen, 2006). Previous literature suggests that adolescents with a weak sense of self had lower reading and spelling levels, as well as lower mathematical abilities (Hay et al., 1998). The purpose of the study is to understand the impact biculturalism has on identity formation throughout adolescent development and, subsequently, its implications on the individual's experience navigating the United States education system, their mental health, and their family dynamic. A cross-sectional, qualitative study will be performed to interview 12 young adults between the ages of 18 and 19 years olds. The interview questions that will be used were created using an interpretive phenomenological analysis. The final results for this research study are pending; however, previous literature suggests the stress from acculturation may negatively impact an immigrant's physiological and mental health (Torres et al., 2012; Cervantes et al., 2019; Finch et al., 2004). Further understanding is needed on the role that cultural identity, or lack thereof, plays on Mexican American adolescents' mental health, education, and family dynamics may help in implementing interventions that foster a stronger self-esteem.

Keywords: cultural loss, identity formation, Latino adolescents

Public Sector Accommodation of Neurodivergence

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This paper identifies and recommends neuro-inclusive accommodation policies. It stems from a study conducted at California State University (CSU), Chico, called "Accommodation of Neurodivergence in Higher Education," which aims to address the significant challenges faced by neurodivergent students, faculty, and staff.

These challenges arise not only from variations in functional abilities and accommodation requirements but also from the stigma and social barriers directed at individuals with neurodivergent conditions (e.g., Autism, ADHD, and Dyslexia). Consequently, neurodivergent individuals often experience lower levels of success in higher education compared to their neurotypical counterparts (Dwyer, et al., 2022). Moreover, this population tends to be underemployed or occupies part-time positions in entry-level jobs, resulting in low income, limited access to health care, and dependence on public welfare (Boeltzig, Timmons, & Butterworth, 2008). These equity gaps are further exacerbated when coupled with intersecting identities, misdiagnosis, and co-occurring disabilities. The existing accommodations for neurodivergence are insufficient. The needs of neurodivergent individuals could be improved by actively learning from those with invisible disabilities. It is known that access to higher education and successfully completing a degree can lead to elevated employment rates, higher salaries, and increased social mobility compared to those without higher education (Migliore et al., 2012). The purpose of this study is to identify and recommend policies that are neuro-inclusive. It is mixed-methods research that includes a review of existing laws, policies, and higher education models related to accommodations for neurodivergent individuals, as well as in-person group interviews, field expert interviews, and open-ended survey questions. The paper argues that fostering faculty understanding, building a supportive campus community, and facilitating networking through existing programs can yield several benefits, including higher recruitment and retention rates among neurodivergent students and employees, a reduction in fail and withdrawal rates, a shorter time to degree completion and increased employment opportunities. This neuro-inclusive model aspires to be broadly applicable to higher education institutions. The implementation of equitable policies will diminish social barriers and stig-

ma while promoting improved equity between neurodivergent and neurotypical populations.

Beliefs about End-of-Life Decisions for Companion Animals

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Faculty Mentor: Linda Kline

Research on human-animal interactions is ever increasing, yet little is known about the cognitive elements behind the decisions made at the end of a pet's life (e.g., general attitudes towards animals). With medical advances in veterinary practice prolonging the lives of companion animals and the process of euthanasia evolving to include pet owners as decision-makers in this process, it is vital to develop an understanding of the pet owners' attitudes and beliefs that underlie end-of-life decisions. Previous research often focuses on the grief and bereavement of pet owners who lose their companion animals (Planchon et al., 2002) or the veterinarians who euthanize them (Dickinson et al., 2011). The purpose of the present study is to develop a survey instrument for assessing attitudes and beliefs about end-of-life, quality of life, and perceived appropriateness of euthanasia as a means to end the life of companion animals. Participants are being recruited using Amazon Mechanical Turk. A sample size of 300 is expected. Each participant will complete a Qualtrics survey consisting of three different instruments: a survey assessing end-of-life beliefs about companion animals (there are two versions – one regarding dogs and one regarding cats), the Pet Attitude Scale – Modified (Munsell et al., 2004), and the Animal Empathy Scale (Paul, 2000). Data collection is currently underway. Separate principle component analyses will explore the underlying structure of the 49 items of the cat end-of-life survey and the dog end-of-life survey. Once the factors on each scale are established, correlations with these factors, animal empathy, and attitudes towards pets will be conducted. Results will be

compared to previous results from a sample of college students (pilot study) in order to explore differences in factor structure based on age and experience with companion animal care. This study is an essential step in identifying the elements behind pet owners' end-of-life decisions regarding companion animals. Understanding these elements is the first step to providing veterinarians and pet owners with cognitive tools to address difficult end-of-life decisions.

Are Humans Just as Impulsive as Nonhuman Animals? An Attempt to Directly Replicate Jimura et al. (2011)

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Faculty Mentor: Patrick S. Johnson

Delay discounting describes how the subjective value of an outcome decreases as the delay to its receipt increases (Madden & Johnson, 2010). Compared to humans, who often tolerate reward delays on the order of years, nonhuman animals discount rewards very steeply, with rewards losing half of their value when delayed by seconds. Recently, Paglieri (2013) cautioned against the conclusion that nonhuman animals are more impulsive than humans, suggesting instead that differences in delay discounting may be attributable to differences in the procedures used in human and nonhuman animal studies. Notably, whereas humans typically answer questionnaires featuring hypothetical choices between “smaller-sooner” (SS) and “larger-later” (LL) monetary rewards, nonhuman animals always choose between real SS or LL outcomes (e.g., food) in real time. To examine whether procedural differences could lead to different performances in delay discounting tasks, Jimura et al. (2011) had human participants complete two delay discounting tasks: one involving choices between real SS and LL outcomes (fruit juice) and one involving choices between hypothetical SS and LL outcomes (money). Under these conditions, Jimura et al. observed significantly steeper discounting of

delayed liquid rewards compared to delayed monetary rewards, suggesting that humans discount like nonhuman animals when choices for real rewards are delayed by seconds. Despite the importance of these results in understanding cross-species differences in delay discounting, no attempts have been made (to our knowledge) to replicate the procedures of Jimura et al. (2011). The present study therefore aimed to compare delay discounting of real liquid and hypothetical monetary following the procedures of Jimura et al. (2011). During experimental sessions, participants ($N = 9$) completed a real liquid discounting task (e.g., 8 mL of juice delivered immediately vs. 16 mL of juice available after a delay), a hypothetical monetary reward discounting task, and a memory filler task. We successfully reproduced the within-subjects findings of Jimura et al., suggesting that humans discount just as steeply as nonhuman animals when the reward is experienced. Planned future research will now compare discounting between real and hypothetical rewards of the same commodity to prevent any confounding due to the experience (or absence) of delay.

Home Share Project: Exploring a Unique Affordable Housing Solution

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In the state of California, homelessness is perhaps one of the most significant socioeconomic issues. The state has already spent billions of dollars in resources to combat the housing crisis. Although there are many causes of homelessness, the shortage of housing is one of the biggest challenges to reducing it. The fastest-growing demographic in California for those seeking aid for homelessness are those aged 55 and older, yet their susceptibility to housing insecurity is often unnoticed. Homesharing is a concept designed to utilize the current housing stock by matching home providers (people with an extra room) with home seekers (those seeking afford-

able housing). Additionally, many homesharing programs are geared towards intergenerational relationships where older adults can age in place through the support of home seekers.

This study aims to build on current literature to provide insight into the homeshare relationships in regard to motivations, relationship dynamics, caregiving, and the role of the third-party organization. Additionally, this research will illuminate differences based on rural and urban geographies in Northern California. This study is a community-engaged qualitative research project designed collaboratively by a team of individuals from UC Berkeley, Sacramento State, and Chico State. Data will be collected through semi-structured interviews.

Eligible participants in this study include people who are currently or recently (within the past year) involved in the homeshare program as either a “home provider” or “home seeker” for at least three months. The homeshare programs collaborating on this research project are Home & Heart in Chico; Homeshare American River in Sacramento; and Front Porch in the Bay Area. Data will be gathered from 35 to 50 individuals. The final results are pending. This study is imperative for increasing understanding of homesharing programs as a solution to the housing crisis and providing additional care for older persons, a demographic whose needs are often disregarded.