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**Association of Pacific Coast Geographers Annual Meeting
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Chico, California

Abstracts for Oral Presentations and Posters

Oral Presentation Abstracts

Mark D. O. Adams, markdadams@fs.fed.us, *USDA-Forest Service Pacific Northwest Research Station*; and **Susan Charnley**, scharnley@fs.fed.us, *USDA-Forest Service Pacific Northwest Research Station*. **The Environmental Justice implications of USFS Hazardous Fuel Reduction: Three Case Studies.** Hazardous fuel reduction (HFR) activities are a key management tool employed by the U.S. Forest Service (USFS) in the interior West and California. HFR activities—stand thinning, prescribed burning, biomass modification—are implemented in part to reduce the transmission of wildfire risk from national forest system lands to adjacent non-federal lands. The USFS is obligated by the 1994 executive order on environmental justice to identify communities with high proportions of low-income or racial/ethnic minority residents that may be impacted by agency actions, and ensure that steps are taken to protect these communities from a disproportionate burden of negative environmental impacts caused by agency actions. Logically, the order also extends to the generation of environmental *benefits* by those actions. Hazardous fuel reduction activities, when successful, can reduce the direct risk of catastrophic wildfire and the indirect risk of poor air quality generated by such fires—an environmental benefit that should be shared as equitably as feasible by all communities neighboring a national forest. We analyzed HFR data from twelve national forests in three western U.S. regions to assess the degree to which hazardous fuel reduction benefits were *negatively* associated with environmental justice community demographics. While no such general negative association was found, we report on three case studies, from Arizona, California, and Washington, in which local spatial associations between the absence of HFR activity and the presence of environmental justice populations illustrate the difficulty USFS managers face in balancing biophysical and community protection objectives in implementing programs like HFR.

Stuart C. Aitken, saitken@mail.sdsu.edu, *Department of Geography, San Diego State University*. **Young People's Rights and Sustainable Ethics.** With this paper I discuss the curtailment of minority young people's right in the face of the transformation away from state socialism in the first instance, toward seemingly free and open neoliberal statehood in the second. Drawing on the local feminist politics of Rosi Braidotti and Elizabeth Grosz, I argue that Spinozan sustainable ethics make more sense as a push against the excesses of neoliberal governance than proclamations of universal

rights. I use empirical examples of precarity, dispossession, and emotional citizenry from Eastern Europe and Latin America to highlight the power of sustainable ethics to build *potentia* (i.e., young people's capacities for change and transformation).

Clark Akatiff, cpakatiff@yahoo.com, *Palo Alto, California*. **The Fabulous Life and Mysterious Death of William Bunge, Radical Geographer, 1928–2013.** The life of William Bunge is remembered, especially in its revolutionary impact upon the profession of Geography. Primarily sourced from film and tape interviews and recorded telephone conversations, as well as upon an archive of correspondence with the late William Bunge, his main ideas and his place in the ongoing evolution of geography will be presented. The author, his ally and friend for forty years, will use Bunge's own words to demonstrate his thoughts on theory, practice, and politics of Geography. Additionally, his personality and personal history as they influence his significance will be considered.

Jeff Baldwin, baldwije@sonoma.edu, *Sonoma State University*. **Sustainability Education through Active-Learning in Large Lecture Settings: Evaluation of Four Out-of-Class Exercises.** Large classes on sustainable development present certain challenges. Often, high student-to-instructor ratios encourage passive learning pedagogies. However, because sustainability education seeks to increase awareness and help students shift to more sustainable behaviors, more active learning is often prescribed by pedagogical experts. This study provides analysis of four out-of-classroom activities undertaken by students in recent offerings of an experimental course on sustainable development taught at Sonoma State University in California. Those activities, innovated specifically for this course, attempt to increase learner-centered activities in large classes that averaged 124 students. Analysis of open-ended reflections indicates that many students experienced raised awareness of sustainability issues. Beyond aspirational statements, student reflections and actual behavioral tracking indicate some shifts to lower-carbon food choices in just four weeks.

Ingrid Behrsin, iabehrsin@ucdavis.edu, *University of California, Davis*. **De/Composing Carbon: Technoscience and the Political Economy of EU Waste-to-Energy Regulation.** Drawing on insights at the intersection of political ecology, science and technology studies, and discard studies, this paper interrogates the scientific rationales that underpin (1) waste incineration's categorization as a type of renewable-energy technology in the European Union, and (2) the market expansions that have made the region's energy production from waste financially viable for the waste-to-energy (WTE) industry. This investigation builds on the emerging literature on renewable energy infrastructure as socioecological fix, and is driven by the question, "How has WTE come to serve as a 'renewable' energy source and socio-ecological fix in the EU?" I argue that specific scientific methods and formulas in EU waste and energy

policy serve to prop up WTE production as a type of renewable energy, and support the construction and subsequent expansion of a regional market in municipal solid waste (MSW) trade. In sum, this article provides a contemporary empirical example of the connected scientific and political economic processes through which energy infrastructure is put forward as renewable, and the ensuing capital-fixing opportunities this designation produces. In doing so, it contributes to dialogues around the political ecology of renewable energy transitions. Its normative objective is to illuminate the political economic logics embedded in the techno-science of renewable energy policy, and thus open up spaces for alternate discourses and knowledge claims around the renewability of controversial technologies to emerge and take hold.

Genie Bey, eugenia.bey@student.csulb.edu, *California State University, Long Beach*. **Cultivating Social-Ecological Resilience and Climate Change Adaptation through Green Infrastructure in Long Beach, California.** The geographic variability and uneven distribution of climate-related impacts pose serious challenges to achieving social-ecological resilience and environmental justice. There are no generalizable solutions for climate-related challenges, which include sea-level rise, increased frequency and intensity of extreme weather events, flooding, heat waves, and droughts. Ecosystem-based adaptation plans have increasingly gained traction as viable, cost-effective strategies to confront climate threats at the local, national, and international levels. Green infrastructure (GI) offers the flexibility of place-based solutions that enhance existing ecosystem services to mitigate local effects of climate change. GI, defined as a combination of green spaces and built systems that provide and enhance ecosystem services for social-ecological systems, can be integrated in response to location-specific challenges to enhance community resilience. This research offers a case-study analysis of the spatial distribution and projected intensity of climate-related impacts in Long Beach, California, and offers a pathway for assisting communities of highest risk to prepare for and cope with projected impacts by utilizing GI as an ecosystem-based adaptation method. A geospatial analysis of the distribution of biophysical and social vulnerabilities in Long Beach reveals two areas of high climate vulnerability that could benefit greatly from the implementation of GI technologies. The analysis will be integrated with a GI suitability assessment and interview and survey data focused on citizen perception of climate risk and desirability of GI solutions in each case-study area. The findings of this mixed-methods research will contribute to local policy and decision making for climate action planning.

Kris Bezdecny, kbezdec@calstatela.edu, *California State University, Los Angeles*. **The Dystopian Consequences to Themed Urban Utopias: The Case Study of Celebration, Florida.** Celebration, Florida, was built in 1994 by the Disney Corporation, themed as a smart, new, urbanist community themed toward the nostalgia of Florida's

small-town past. Celebration was a company town, one marketed toward consumers of Disney's corporate products rather than toward the labor used by the largest employer in the state. This community was to be an urban utopia, in the image of Walt Disney's original vision for the Experimental Prototype Community of Tomorrow. This presentation will explore the history of Celebration and its relationship with both Walt Disney World (and its autonomous governmental entity, the Reedy Creek Improvement District) as well as its relationship with Osceola County, Florida, and nearby surrounding communities in Orange County. In addition, the evolution of Celebration as an actual community, rather than an ideal of a community, will be analyzed. This presentation will discuss Celebration as a case study indicative of the uneven geographical development inherent in urban theming and in neoliberal urban development projects such as new urbanism and gentrification.

Gregory S. Bohr, gbohr@calpoly.edu, *California Polytechnic State University, San Luis Obispo*. **Variability in California Snowpack, and the Contribution of Extreme Storm Events.** Winter precipitation accumulating as snowpack in the high elevations of the Sierra Nevada mountain range is a critical source of spring and summer water supply in California. Ongoing climate change in the western United States is likely to affect the amount (water equivalent) of this snowpack, as well as the timing of peak snowpack and the onset of the spring melt. Extreme precipitation events tend to contribute disproportionately to precipitation totals; changes in the magnitude and/or frequency of these events is therefore likely to have an outsized impact on snowpack levels in the future. In this project, daily snow-water equivalent (SWE) observations from 119 automated snow pillows distributed throughout high-elevation regions in and around California are used to quantify the contribution of extreme events to annual snowfall and examine trends in this contribution. Extreme (ninetieth percentile) accumulation events average approximately four inches of SWE, typically last three days or fewer, and contribute an overall average of about forty percent of total snowpack. This contribution is significantly higher in wet (top tercile) years, in which it reaches fifty percent, and falls to around thirty percent in dry (bottom tercile) years. Trends in the frequency of extreme accumulation events are generally negative, with significant trends in the southern portion of the Sierra. The total contribution of extreme events to seasonal snowpack likewise appears to be diminishing, albeit with less overall significance.

Jacquelyn R. Chase, jchase@csuchico.edu, *California State University, Chico*; **Denise de Castro Pereira**, dpereirapuc@gmail.com, *Pontifical Catholic University, Minas*; **Liliane Oliveira Guimarães**, lilianeog@pucminas.br, *Pontifical Catholic University, Minas*; and **Paulo Victor Siffert**, siffert13@hotmail.com.br, *Pontifical Catholic University, Minas*. **Where Is the Struggle? Content Analysis of Field Research with Communities Displaced by Mining in Brazil.** This study summarizes ten years of

mostly unpublished documentation by researchers of rural communities that have been displaced and otherwise impacted by the Anglo-American iron-ore mining complex in the state of Minas Gerais, Brazil. As mining companies push into new communities and regions, local resistance is fortified by alliances with progressive academic actors such as the GESTA laboratory of environmental conflicts at the Federal University of Minas Gerais, and judicial institutions such as the Public Ministry of the State of Minas Gerais. A rich archive of academic research has built up around the first ten years of Anglo-Americans' intrusion into an area known for its historic landscapes, kin-based rural communities and sustainable tourism. This archive (much of it written by university students) remains mostly untranslated and unpublished. Our objective is to highlight the territorial nature of struggle as well as to make the original research more visible to a wider English-speaking audience. Using content analysis, we focus this analysis on the themes of displacement, trespass, and property rights as reflected in narratives, photographs, and maps.

Dongmei Chen, dongmeic@uoregon.edu, *University of Oregon*; and **Christopher Bone**, chrisbone@uvic.ca, *University of Victoria*. **Climate, Fire Suppression, and Mountain Pine Beetle Outbreaks: Conceptual Models for Socio-Ecological Systems.** Climate change and fire suppression have been the most-significant factors contributing to recent increases in the extent and intensity of fire and insect outbreaks, which are two main agents that shape forest landscapes in North America. The relative role of climatic and anthropogenic controls on forest disturbances have been one key debate in landscape research, and we need to enhance our understanding of complex socio-ecological systems (SES) due to the increasing influence of human activities on ecosystems. This study evaluates cross-scale SES for the mountain pine beetle (MPB) by presenting conceptual models of fire-insect interactions under climate change and forest governance in different fire-adapted ecosystems. Our objective was to synthesize the current studies about the effects of climate and fire control on fire-insect interactions across different spatiotemporal scales, and provide support for a better understanding of SES and thus human decision-making in complex ecosystems. We selected two different fire-adapted ecosystem types—the Rocky Mountains and the Sierra Nevada—to explore the interactions among climate, fire, and insects, and how humans play a role in the dynamic systems through the fire exclusion policy. Specifically, fire suppression can be ineffective in some high-severity fires in the Rocky Mountains, whereas aggressive fire control in the ecosystems that have been adapted to low-severity fires in the Sierra Nevada can bring negative outcomes. Fire can also change the susceptibility of trees to insects. The MPB outbreaks are then impacted to different extents by climate and fire suppression across space.

John Crowell, jcrowell@una.edu, *University of North Alabama*; and **Michael Pretes**, mjpretes@una.edu, *University of North Alabama*. **The Millennial Generation, Gen-**

eration Z, and National Parks: A Case Study of Visitor Age Trends in Olympic and Mount Rainier National Parks. Recent media reports have suggested that members of the Millennial Generation (those born between 1981 and 1997) and Generation Z (those born after 1997) are less inclined to visit national parks, compared to older generations. We used three methods to examine the validity of these media statements: Qualtrics-based social media surveys (on Facebook, Twitter, and Instagram); face-to-face, semi-structured interviews with park rangers and local business owners at and near two national parks (Mount Rainier and Olympic, both in Washington state); and on-site observations and counting of visitors at visitor centers and on trails in the same two national parks. We compared these observations with the limited historical data on visitor ages available from the National Park Service. Our initial results suggest that media reports are overstated, and that the number of both Millennial Generation and Generation Z members visiting national parks is at least stable and perhaps even increasing. A possible explanation for divergent results is that younger people may be accessing park information through online and social media sources, and therefore bypassing visitor centers and direct contact with park rangers.

Robin E. Datel, datel@csus.edu, *California State University, Sacramento*. **Civil Rights Geographies: Geography Awareness Week 2017 at California State University, Sacramento.** The theme of Geography Awareness Week (GAW) 2017 (November 13–19) is civil rights geographies. At CSU Sacramento, the Geography Department is preparing a three-month-long exhibit for a set of prominently located cases in the campus library. The cases will feature work on civil rights from various paradigms in geography, ranging from spatial science to landscape studies to critical geographies. Materials on civil rights geographies at different locations and scales—in the Sacramento region, across the United States, and in other parts of the world—will be included. A diversity of groups that have experienced discrimination and fought for civil rights at different points in history, as studied by geographers and other scholars with a focus on space or place, will be featured. Items from several of the university library's special collections will be included, to make viewers aware of resources available for the further study of local civil rights histories and geographies. Mini-posters on civil rights topics by students in an urban geography course will embody the undergraduate teaching mission of the department. On GIS Day, the Wednesday of GAW, the static displays will be complemented by students helping library visitors to interact with Internet maps and other graphics devoted to civil rights topics. The display supports the Geography Department's outreach to an increasingly diverse student body; supports the ongoing book project *A People's Guide to Sacramento*; and will be available to local geography teachers through the department's participation in the California Geographic Alliance.

Jonathan C. DeBoer, jdeboer@nevada.unr.edu, *University of Nevada, Reno*; **Aaron M. Bauer**, Aaron.Bauer@villanova.edu, *Villanova University*; and **Jill S. Heaton**, jheaton@unr.edu, *University of Nevada, Reno*. **Ecological Modeling of the New Caledonian Gecko Genus, *Bavayia***. The southwestern Pacific Island of New Caledonia has a highly endemic herpetofauna that includes eight genera of geckos and sixteen genera of skinks. Representatives of different genera are typically morphologically and ecologically distinct from one another, but congeneric taxa may be very similar in both regards. Members of the diplodactylid genus *Bavayia* exhibit this pattern. Twelve species of *Bavayia* are currently recognized; however, genetic data have revealed twenty-eight additional candidate species, some of which are virtually indistinguishable from one another. I hypothesized that the diversity of *Bavayia* represents a case of “non-adaptive” radiation, in which cladogenesis occurs through allopatric isolation, but retain pleisomorphic tendencies. In other words, speciation occurs due to geographic barriers, but niche differentiation does not follow where ecological preferences remain unchanged. To evaluate this hypothesis, I generated predictive niche models using the GIS program Maxent to test for spatial niche similarity in described and candidate species of *Bavayia*. I obtained more than 2,200 *Bavayia* records from which I extracted 281 unique localities for distribution models. In addition, twenty-three abiotic and biotic environmental layers were considered for Maxent predictive niche models. I conclude that genetically divergent but morphologically conservative species have similar ecological preferences, and are consistent with a “non-adaptive” radiation. Conversely, morphologically distinct taxa, even if sympatric, have different ecological preferences.

Patrick G. Duffy, patrick.gavin.duffy@gmail.com, *University of California, Berkeley*. **Yosemite, America's Secular Cathedral**. I refer to Yosemite as “America's Secular Cathedral” because the ubiquitous images of it signify America to the world at large, and because I consider “God-as-Revealed-in-Nature” to be the acme of American religious feeling. The physical layout of Yosemite Valley can be seen as mimicking that of a European cathedral writ large, with Half Dome serving as the altar and waterfalls standing in for stained-glass windows; it entered the American consciousness at the height of the Civil War, when the Valley was granted to the new state of California by Lincoln to be “devoted forever to popular resort and recreation.” In that Yosemite had not been “discovered” by the Spanish people who colonized California long before the arrival of the millions of Americans who poured in after the discovery of gold, it was not tainted by prior contact with a rival European culture. Indeed, Yosemite came into American hands directly as it was torn from the care of the Native Americans for whom it had been a last refuge from the predations of the '49ers who swarmed the foothills below. The spiritual dimension of the Valley, from an American perspective, was outlined by one member of the expedition that drove Chief Tenaya's band of Miwok Indians from the Valley in 1851: “...as I looked,

a peculiar exalted sensation seemed to fill my whole being, and I found my eyes in tears with emotion.” The objective of this paper is to trace the development of that impulse through to the present day.

Ian M. Dunham, iandunham@sfsu.edu, *San Francisco State University*. **Citizen Science for Urban Forest Management: Data Density and Richness of Urban Forest Volunteered Geographic Information.** This paper examines the potential benefits and pitfalls of the use of volunteered geographic information (VGI) in natural-resource management and environmental policymaking through the example of Web-based VGI urban tree inventory applications. Recent advancements in geospatial technology allow for novel opportunities for collaborative civic engagement and bottom-up knowledge production. One example is Web 2.0 urban tree applications that facilitate the collection and dissemination of user-generated or crowdsourced urban forest data. In recent years, such applications have been launched in a number of American cities through partnership efforts between government entities, NGOs, and businesses. Despite the promotion of VGI as a means to democratize access to geographic knowledge production, concerns surrounding uneven levels of participation and spatial coverage have been raised. We hypothesize that asymmetries in the density and richness of data may be present, which may ultimately undermine the effectiveness of these applications. This research examines the spatial distribution and data richness of urban forest VGI in Philadelphia, Pennsylvania, and San Francisco, California, via the Philly Tree Map and San Francisco Urban Forest Map applications, respectively. Using ordinary least squares (OLS), general linear models (GLM), and spatial autoregressive models, our findings reveal that sociodemographic and environmental variables are strong predictors of both densities of attributed trees and data richness. This research contributes to recent interest in the implications of the use of newly emerging data-driven computational approaches and “big data” to influence environmental management and policymaking decision processes.

Daniel Ervin, ervindaniel213@gmail.com, *University of California, Santa Barbara*; **Rene Nevarez Sanchez**, rnevarez@colef.mx, *El Colegio de La Frontera Norte (COLEF)*; **David López-Carr**, carr@geog.ucsb.edu, *University of California, Santa Barbara*; and **Silvia Mejia Arango**, smejia@colef.mx, *COLEF*. **Rural and Indigenous Origin Predicts Diet Change and Diet-Related Anthropometrics in Recent Migrants to Tijuana, MX.** This study investigates how migration history influences diet and diet-related health among recent internal migrants to Tijuana, Mexico (n=93), finding that migrants from rural places and of indigenous status have better diet-related health, yet have undergone more diet change during their migration. These results are consistent with previous research concerning the effects of migration upon health behaviors and the protective effects of rural and indigenous origin. This study adds

to the literature attempting to explain the “Immigrant Paradox” and indicates the importance of migration history and geographic variables in health-related research with migrants as well as the potential for targeted dietary interventions for rural and indigenous migrants.

Austin D. Evans, austinevans@nevada.unr.edu, *University of Nevada, Reno*. **Influence of Wild Horses on the Physical Landscape of Nevada.** This study examines the influence of feral or wild horses on the physical landscape in Nevada. This involves looking at physical landscape transformation within the Great Basin, from the introduction of these animals during the time of the Spanish conquistadors through the current decade. This analysis includes examining changes in the size of the horse population and their ecological impacts, including effects on plant and shrub health along with other organisms. This study relies on research from scholars and organizations as well as personal discussions with ranchers and government (BLM and Forest Service) land managers across the state with applied experience. I expect this study will demonstrate the vegetative, soil, and damage to other species these horses have had on the ecosystem across Nevada. This has implications on resource management decisions that weigh the societal value of these horses against the ecological impacts they permeate.

Dean H. K. Fairbanks, dhfairbanks@csuchico.edu, *California State University, Chico*; and **Anita M. Chaudhry**, achaudhry@csuchico.edu, *California State University, Chico*. **Selling Water from a Distance or the Neighbor Effect? Drought-Driven, Short-Term Agricultural Water Sales in Northern California’s Private Irrigation Districts.** We examine determinants of annual landowner participation at the parcel level in land-fallowing decisions in the rice-growing region of Northern California to understand the determinants of their participation in short-term water sale markets during droughts. Sample rice farmers hold senior water rights and are an important source for water supply in droughts when they fallow their fields and sell their surface water rights. Previous research on absentee land owners have shown mixed involvement with land management or involvement in government programs involving their land, whereas local landowner decisions can show a neighbor effect for adoption of farming patterns such as organic certification and introduction to new technology. This investigation looks at the degree to which either spatial effect impacts the probability that a nearby farm will go fallow. The analysis is based on five years (2009–2014) of satellite data on land use matched to land parcel ownership data. We examined transfer years (2010, 2012, 2014) versus non-transfer years (2009, 2011, 2013). We find that although participation in water transfers has oscillated in consecutive years, the trend is increasing. Absentee land owners increased their fallowing over time with transfer years, and there was a strong spatial autocorrelative neighbor effect determined by district and adoption of organic practice.

Matthew T. Fuller, mtfuller@uvic.ca, *University of Victoria*. **Alliance-Building on the Thin Green Line: Indigenous/Non-indigenous Confrontations with Extractivist Industries and a Case Study of the Lummi Nation Totem Pole Journey.** For the last several years, the House of Tears master carvers of the Lummi Nation in Washington state have embarked on a cross-continental journey with their traditional totem poles to draw attention to the environmental degradation and climate justice issues resulting from extractive industries and the development of fossil fuel megaprojects. The Totem Pole Journey, which involves the gifting of these totems to Indigenous communities at the front lines of environmental ruination caused by these megaprojects, has the goals of fostering communities of resistance to halt these projects and connecting settler allies working on environmental issues to Indigenous organizers who operate with traditional ways of knowing and organizing. The Journey breaks the multi-layered binds of existing power structures and hierarchies, spatially and temporally, through the co-creation of temporary ceremonial space where new bonds of horizontal community resilience are forged. It exists as a premeditated form of creative, performative resistance, outside the usual channels of Indigenous lobbying and legal actions, and speaks collectively with spiritual, moral, and ecological authority that state and industry are unable to respond to. The now-annual Journey has helped foster synergistic power in new alliances of settler spiritual communities, eNGOs, and Indigenous organizers, and has played a crucial role in several struggles to halt extractive megaprojects. Additionally, these alliances are increasingly centering the desires of frontline Indigenous resistances, on their own terms, as values of climate justice, solidarity work, and intersectional social movements grow not just rhetorically but in the actions of settler allies.

Brian Garcia, brian.garcia.09@ucl.ac.uk, *University College London*. **Place and Public Transport.** Public transport lines are being promoted all over the world to reduce environmental challenges related to population growth and less-sustainable travel modes such as the private car. Mode shift from the private car to more-sustainable modes remains the key to environmental benefits (Chester & Horvath 2010). How can mode shift be encouraged as a part of new transport infrastructure? Density and park-and-ride stations have been debated as drivers of passenger rail (Handy et al. 2005; Mees 2010; Mingardo 2013). A mixed-methods approach involved mapping for diagnosis, content analysis, a public-realm site analysis similar to Whyte's classic study of public places (1988), and an expanded multivariate statistical analysis of Bertolini's node-place model (1999) with many demographic and architectural indicators introduced. Los Angeles is the largest focus of this study because of the rapid expansion of passenger rail within the auto-dominant city. This research model is then applied to other international cities. Findings revealed that higher passenger rail use is related to population and housing density in the Los Angeles case. Park-and-ride stations translated into higher ridership. Meanwhile, wealth had a strong

inverse relationship to ridership. Station design elements such as transfer available, configuration, and propulsion had a high impact on passenger rail ridership in all five international cities studied. These findings show where new lines should be placed or how stations can be designed for a greater number of riders and return on fares, as well as environmental benefits.

Elena Givental, elena.givental@csueastbay.edu, *California State University, East Bay*. **“Using Capitalism to Save Socialism”: International Tourism in Havana, Cuba.**

This paper is inspired by the author’s recent experience as a tourist in Havana. Since the 1990s, during the “special period” in economic development, Cuba turned to tourism as a “replacement industry” after the collapse of the Soviet Union. Havana has attracted the bulk of tourist arrivals that spurred a process of urban reorganization. Havana’s urban transformation is visible in its cityscape through the eclectic mix of partially restored Old Havana center with still crumbling infrastructure, blocks of standardized Soviet-style apartment buildings, revolutionary monuments, an array of recently established flourishing restaurants, and scores of petty commerce vendors. While the government controls major tourist operations, the decriminalization of the dollar and partial legalization of self-employment and Real Estate market have allowed for the fast growth of mundane entrepreneurship, largely financed by the Diaspora remittances and supplied by the “grey” market. The author reflects on the observations of routine governmental efforts to put up barriers to tourism entrepreneurship, juxtaposed with the daily small-business struggle to succeed that provide insights into the dynamics of economic and social change in today’s socialist Cuba.

Julia L. Goldsworth, jgoldsw@usc.edu, *University of Southern California*. **Exploring Land Use Changes in the City of Irvine’s Master Plan.** The City of Irvine is one of the largest and earliest planned communities in the United States. It began in the 1960s after the University of California agreed to put its newest campus on the Irvine Ranch. The Irvine Company developed a General Plan for a small city of 10,000 people around the university, but eventually expanded that plan to include the entire 100,000-acre Irvine Ranch. When the city incorporated, the new city council did not start from scratch but built upon the Irvine Company’s master plan. This area was unique for a planned community in that it was huge, mostly undeveloped, and mostly under one landowner. GIS is used in this study to digitize and compare the 1973 General Plan of the Irvine Company with the 2017 land-use database to determine if and where land-use changes have taken place. Parcel data from 2017 was compared with the 1973 Irvine Company General Plan map to enable the tracking of changes for each parcel. The first research objective was to compare these two maps and locate changes. The second research objective is to see whether there are any trends in land-use changes. This study found an increase in the amount of land dedicated to Open Space and a surprising decrease in residential density in parts of

Irvine. Another trend is adding residential units inside the Irvine Business Complex. The resulting database could be used for future studies involving one of the biggest planned communities in the United States.

Steven M. Graves, steve.graves@csun.edu, *California State University, Northridge*. **Domestic Water Consumption: Profligacy and Conservation in Santa Clarita.** Santa Clarita is a sprawling suburb on Los Angeles' northern flank. Its population of nearly 200,000 is generally upper-middle class, white and socially conservative—factors that tend to undermine efforts by local officials to curb domestic water consumption. The water consumption patterns of nearly 50,000 households and three water purveyors were analyzed for a period of ten years, including two years of mandatory water restrictions. Several compelling trends are evident in the data, each with significant implications for the long-term water policy in places like Santa Clarita.

Maranda J. Hamilton, hamiltom18@up.edu, *University of Portland*; **Summer L. Grandy**, grandy18@up.edu, *University of Portland*; and **Ted C. Eckmann**, eckmann@up.edu, *University of Portland*. **Modeling Soil-Vegetation-Atmosphere Interactions on a Green Roof in Current and Future Climates.** Many studies have documented how native plants that thrive at ground level often do not succeed on nearby green roofs. Studies have also found that the species originally planted on a green roof are often outcompeted by non-natives in some portions of the green roof. Evidence suggests that microclimate conditions on most green roofs vary substantially by location across the roof, and this could explain why some plants die in some portions of a green roof but succeed in others. Unfortunately, few studies have investigated this important within-roof microclimate variability. Our research fills this gap by developing new methods for using a computational fluid dynamics (CFD) model called ENVI-met to calculate air and surface temperature, winds, humidity, direct and diffuse radiation, soil moisture, and other microclimate variables at sub-meter resolution. We validated this model using automated stations that measured these parameters on a green roof at the University of Portland campus in Portland, Oregon. These variables exert strong influences on the success of common green-roof plant species, so the new modeling approach developed by this study can improve green-roof planting strategies in the Pacific Northwest and many other regions worldwide. In addition to potentially improving green-roof design in current climates, this study also demonstrates how our modeling framework can inform planting strategies so they account for anticipated future climate changes. Through this, we also show CFD model output for the effects of climate changes within a green roof at sub-meter spatial scales.

Don L. Hankins, dhankins@csuchico.edu, *California State University, Chico, California Indian Water Commission. Ecocultural Equality in the Miwko? Waali?* California's water infrastructure relies heavily on the Sacramento-San Joaquin Delta (Delta) for supply and conveyance to a multitude of users. This reliance conflicts with the ecological importance of the Delta for critical functions and services it provides as the largest estuary on the west coast of North America. At risk are entire ecosystems, which provide habitat for a diversity of resident and migratory species including endemics like the Delta smelt. Furthermore, the Delta is situated within the Miwko? cultural landscape, which is founded on the relationship between the regions Indigenous people and the ecological system. This paper illustrates the ecocultural context and significance of this landscape, which has largely been overlooked in addressing demands for water resources. It provides some examples of how a more holistic view might achieve ecocultural equality based on Miwko? traditional cultural practice and law.

Katherine R. Hayes, khayes2@uoregon.edu, *University of Oregon*; and **Daniel Gavin**, dgavin@uoregon.edu, *University of Oregon. Reconstructing Paleofire in Old-Growth Coast Redwood Forests of Northern California, Using Pyrogenic Carbon and Soil Charcoal.* Fire is an important ecological feature in coast redwood forests, yet many characteristics of the coast redwood fire regime remain uncertain due to the absence of fire records extending beyond the past two thousand years. This study examines the legacy of fire in coast redwood forests in Humboldt County, California, through the quantification of soil macro-charcoal and pyrogenic carbon levels of soils in old-growth redwood forests. These proxies will complement existing dendrochronological records and will strengthen our understanding of the role of fire in coast redwood forests prior to Euro-American settlement. To achieve our objective of accessing a record of prehistoric fire, we sampled soils in the Headwaters Forest Reserve, a relatively undisturbed fragment of old-growth redwood in Humboldt County. Our preliminary results include radiocarbon dates from macro-charcoal that indicate fire events taking place as far back as 6,000 $\pm$ 14 years before present. Ongoing work addresses: (1) soil carbon levels in old-growth redwood forests, (2) the synchronicity of dendrochronological fire records with the soil charcoal record, and (3) the variability of fire events and biomass burning in the soil charcoal record across the past six thousand years. Initial results from the ongoing analysis of soil samples and radiocarbon dates will be presented, informed by our synthesis of the existing dendrochronological record. Information from this multi-proxy analysis will help clarify our understanding of the relationship between fire and coast redwoods and may contribute to the ongoing discussion regarding the role of fire management policy within coast redwood forests.

Lily House-Peters, lily.housepeters@csulb.edu, *California State University, Long Beach*. **Integrating Climate Justice and Social Justice in the Geography Classroom: An Experiential Pedagogy Approach.** Climate-change processes and dynamics, such as mitigation, adaptation, resilience, and the socio-environmental dynamics of our changing climate, are increasingly present across the physical and human Geography curriculum in higher education. Yet, climate justice and, in particular, the intersections of climate justice and social justice, remains less well integrated into Geography curriculum, with far fewer examples of undergraduate courses that explicitly focus on the intersection of race, social activism, uneven power relations, and environmental justice in the context of climate change. Climate justice—operating at the intersection of environmental degradation and the racial, social, and economic inequities that produce it and which it perpetuates—presents one possible framework for exploring these themes in the undergraduate Geography classroom. In this presentation, I discuss an experiential pedagogy approach to climate justice conducted with an interdisciplinary group of freshmen students enrolled in the course Sustainability & Technology in Los Angeles. The experiential pedagogy activity, the Toxic Tour of Long Beach, utilizes a climate justice framework to introduce students to the challenging concepts of power dynamics, subjectivity, social difference, and community activism with the ultimate goal of producing new pedagogical space to contemplate more equitable, just, and responsible alternative social-ecological futures in a changing climate.

Jeffrey S. Jenkins, jeff.jenkins@ucmerced.edu, *University of California, Merced*. **CAMERA: Developing a Comparative Photographic Assessment to Communicate Climate Change and Survey Participants on Management Preferences in the Sierra Nevada.** Forests serve an important role in buffering for the impacts of climate change, given the services they provide as watersheds and recreational landscapes for surrounding regions. Changing temperature and moisture levels have resulted in increased variability and magnitude of weather events amid already impacted public lands at the wildland-urban interface, which can be understood as a coupled and complex socio-ecological system. In the southern Sierra Nevada, higher- and lower-than-average precipitation, snowpack, and streamflow regimes have resulted in functional and aesthetic alterations to forests through floods, wildfires, and drought-induced tree mortality. Lands agencies find themselves constrained in their ability to manage forests, given the uncertainty of climatic projections and the inflexibility of existing policies to adapt to change. Lands agencies have thus adopted various management approaches for impacted ecosystems and amenities that anticipate future conditions, mitigate impacts, and adapt to change. These approaches include static preservation (an “ecology museum,” or restoration back to a known state, often a pre-colonial settlement base datum), adaptive management (with sufficient political-legal flexibility to alter course and ability to collaborate),

and passive management (or non-intervention, simply letting nature take its course). Examples include: the mandate for the Park Service to preserve cultural ecosystems as they were, replanting seed stock in the anticipated future range of a species, and allowing a high-fuel-load forest to catch fire and burn without preventive measures to alter the understory. Each approach contains trade-offs unique to the issue at hand between recreational access, economic impacts, and ecosystem function. Therefore, management approaches are valued differently by a wide spectrum of users who work, recreate, and rely on nature's infrastructure, both those living in the Sierras and in the surrounding region. In this paper presentation, I will discuss the development of CAMERA: Comparative Adaptive Management and Ecosystem Response Assessment, a photographic public participation GIS of approximately thirty sites designed to survey people's preferences associated with landscapes, resilient or vulnerable, and communicate management approaches used to sustain them in light of climatic change, ecological disturbance, and land use in the southern Sierra Nevada.

Rajrani Kalra, rkcalra@csusb.edu, *California State University, San Bernardino*. **Exploring Sikhs and Sikhism in and around California.** This paper will explore the Sikh religion and the Sikh landscapes in and around California. The purpose of the project is to determine how Sikh population has impacted the social-economic culture of our region. It will explore the determinants of its settlement outside Punjab and the major challenges which the Sikh population encounters. The project will use a mixed-method approach incorporating Census data and interviews as well as spatial analysis.

Rose H. Keller, rose_keller@nps.gov, *National Park Service, Denali National Park and Preserve*. **Where Connection and Consumption Collide: Does Wilderness Experience Contribute to Stronger Connection to Wilderness among National Park Users?** Drawing on a 2017 Denali backcountry survey of summer visitors to the Park, this study critically examines a common notion that time spent in place contributes to stronger place attachment (and stewardship) of wild landscapes. This study questions whether time spent in the Denali wilderness and time spent in other wilderness areas result in a deeper connection to place, as measured through need and quality of connection with nature, reported environmental behavior, and allocation of existence vs. consumptive values of wilderness/protected lands. GPS tracks linked to surveys reveal how sense of place is spatially distributed across individuals. The results show that frequency of visits to Denali and previous wilderness experience were not causally associated with individuals' wilderness value allocations. However, the results also demonstrate that distance traveled within Denali has a divergent effect on value allocation; greater extent within the Park correlates with lower relative ranking of consumptive values of wilderness recreation and higher existence values. Social media use was found to significantly mediate value allocations as well as

reported environmental behavior. These findings will be used to help National Park managers understand the distinctions among visitors' engagement with the park as well as assess the effectiveness of current management practices of Denali's backcountry in providing a pristine wilderness experience for a diversity of user groups.

Scott B. Kelley, scottkelley@unr.edu, *University of Nevada, Reno*. **Autonomous Hesitancy: Spatial Patterns of Travelers Unwilling to Consider Connected and Automated Vehicles (CAVs)**. Public interest in connected and automated vehicles (CAVs) continues to grow, and some are beginning to consider how a widespread use of CAVs will impact cities and regions. Such a shift, if realized, would require a significant change in travel behavior for many. While some studies have begun to identify areas where future CAV travel demand may exist, and where it may be beneficial, little attention is devoted to the identification of areas where people are more hesitant to consider CAVs for travel, and the spatial patterns of such perception. To address this shortcoming, this study gathered data from an intercept travel survey in Ann Arbor, Michigan, in the spring of 2017. Respondents were asked to consider their willingness to use a CAV for their current trip, and provided approximate trip origins, destinations, and home locations. Out of the 233 respondents at four travel destinations around the city, thirty percent stated that they would not use a CAV for their trip, if such a vehicle were available to them. Observed travel relative to the survey sites for those unwilling to consider CAVs was generally clustered in the dense, downtown area of the city, and such respondents were more likely to be transit riders who did not live in higher-income neighborhoods. This suggests that areas that are considering CAVs as part of their transportation systems may face reluctance in subregions of cities, though more research is needed to see how such consideration varies between cities and for different travel purposes.

Cheryl L. King, clking@csu.fullerton.edu, *MA candidate at California State University, Fullerton*. **Advocating for Geography Literacy in K–12 Education for Readiness in College, Career, and Global Citizenship: Part II** (in continuation of the study proposed at APCG 2016 in Portland, with the completion of thesis research findings). Unfortunately, the regulations of the standards make finding a geography in K–12 education complicated because geography is interrelated with many subjects and thus can easily find itself divided between a number of superficially similar topics. I will attempt to pinpoint geography's ideal position in K–12 curriculum, determine where the standards are being taught, and determine whether the standards are being met throughout. Current mandated national standards call only for geography to be taught to a level of college and career readiness, and I argue that college and career readiness are substandard expectations. We need our students to be educated to a level of global citizenship where they can comfortably match the levels set by other leading nations.

Cameron Krek, cameronkrek@gmail.com, *University of Nevada, Reno*. **Comparison of Areas in California where Trees Died from Bark Beetles Infestations with Wildland Fire.** This study analyzes California areas in which coniferous trees have recently died due to bark beetle infestation relative to fire behavior, with the focus on fire starts and the areal size of the fire. It is anticipated that areas with higher mortality rates due to bark beetle infestations will be associated with more wildland fire starts and also with a higher average fire size than those areas without bark beetle infestation. This study relies on U.S. Forest Service data, including all species of trees killed in bark beetle infestations from the years 2005 and 2016, in addition to looking at the bark beetle infestation and comparing it to the fire data for areal size and amount of starts in 2005 and 2016. This study is designed to provide clearer understandings about the connections between bark beetle infestations and fires that may be useful in other parts of the country as well. Within California, the study provides information that could be useful in strategically reducing firefighting hazards, educating the public, and increasing funding for strategic fuel management.

Henry H. Krichbaum, hkrichbaum@nevada.unr.edu, *University of Nevada, Reno*. **Viability of Geothermal as an Alternative Energy in the Western U.S.: An Economic Analysis.** This paper investigates some of the economic dimensions of geothermal relative to other alternative energies, such as wind energy and solar energy. The economic aspect of this study focuses on cost, total power production, and scalability of geothermal energy compared to wind and solar energy production. This study also considers how new technologies might improve these aspects of geothermal energy as well as other uses for geothermal beyond power production. This investigation will focus primarily on the western United States, where geothermal potential is high. This study aims to establish some of the economic aspects that influence where geothermal energy stands right now, along with its potential.

Rheyna Laney, laney@sonoma.edu, *Sonoma State University*. **Assessing Payment-for-Environmental-Services (PES) Projects in Support of Wildlife Habitat on Agricultural Working Lands.** This study examines three payments-for-environmental-services (PES) agri-environmental projects promoting wildlife habitat on working lands in Northern California's Sacramento Valley. It uses remotely sensed imagery and other data to clarify when and why a gap in wintering shorebird habitat occurs on rice lands within the late winter season, and to assess how effectively the three projects induced shallow flooding to fill that gap. Results reveal that dry weather combined with the high cost of water drive shortfalls in February, and that ag-wildlife conflicts become the main reason for habitat gaps in March. In some situations, the projects successfully reduced the habitat gap. In others, they forfeited substantial conservation benefit and cost-efficiency because project design parameters did not always address the correct cause and timing of the habitat bottlenecks.

Naomi W. Lazarus, nlazarus@csuchico.edu, *California State University, Chico*. **A Risk Assessment of the Dengue Virus in Southwestern Sri Lanka.** This study evaluates the risks associated with the dengue virus in selected subdivisions in Sri Lanka. An ecological approach is adopted to examine the vulnerability of populations to environmental hazards. The location of people in hazard-prone areas increases their exposure to environmental changes and contributes to physical vulnerability. Social vulnerability is tied, in part, to the demographic and socio-economic characteristics of the population and their access to resources. The hazard risk location model (HRLM) is used to conduct a place-based assessment of exposure and coping ability. The model combines regression and a threshold analysis to evaluate the variables that contribute to the incidence of dengue cases in urban and rural areas. A comparative analysis of hazard risk maps, based on predicted and actual dengue cases, revealed similarities and differences in the number and location of subdivisions exposed to the virus. The results highlighted spatial variation in the relative contribution of variables representing hazard, exposure, and coping ability across the subdivisions under investigation. The place-based approach to risk assessment adopted in this paper contributes to the study of vector-borne diseases and their impacts on human populations.

Devin M. Lea, dlea@uoregon.edu, *University of Oregon*. Bringing place and student agency to physical geography discussions of climate change. Lectures and discussions on climate and environmental change in physical geography courses tend to focus student learning on the “placeless” physical processes and global or regional patterns of observed or expected alteration. These emphases thus can leave missed opportunities for students to connect class concepts with places they frequently experience, as well as possibilities for students to recognize their agency to effect environmental change. Using the University of Oregon as an example institution, this paper envisions how the “placeless” and global scales of climate change taught in introductory and upper-level physical geography courses can integrate “actionable” local or place-based student assignments. In the introductory physical geography course, students learn to question what is “natural” environmental change and how they might effect change by analyzing past, present, and potential future scenarios of land cover in a local park. In the upper-level physical geography course, students choose a local environmental concern affected by climate change and workshop a written opinion piece or policy brief. These actionable outcomes are designed to help students recognize that environmental change is not an abstract concept to memorize, but rather something that is contested, local, and possibly affected by their actions.

Michael T. Lemmon, michaellemmon@nevada.unr.edu, *University of Nevada, Reno*. **Assessing the Advantages and Disadvantages of Privately Financed Highway Infrastructure Through Public-Private Partnerships.** This study examines the

advantages and disadvantages of constructing highway infrastructure financed by the private sector. New transportation infrastructure projects are constantly needed throughout the world that cannot be financed by the public sector. Eighty-five countries around the world have used public-private partnerships for highway infrastructure projects, and they continue to be popular. These partnerships tend to be different from project to project based on the complexity of the contract between each party; however they all require the expertise and/or financing from the private sector to complete the project. This shift in financial and constructional responsibility to the private sector comes with a plethora of advantages and disadvantages to the economy, policy, and infrastructure technology. My objective in evaluating public-private partnerships for constructing highway infrastructure is to provide a better understanding of their advantages and disadvantages. This will foster a better understanding of how these partnerships should be pursued and whether or not they should be used for certain projects.

Kyle Loewen, kyle.loewen@geog.ubc.ca, *The University of British Columbia*. **Producing Delivery: Gender, Work, and the (Re)construction of Retail Markets.** Point, click, and two days later it is at your doorstep. In the last fifteen years, e-commerce has exploded from selling relatively specialized commodities like books to everyday necessities like groceries, toilet paper, and dog food. But what political and economic conditions underlie this growth? What labor practices do they rely on? What are the political implications of this development? In this paper I begin to address these questions by framing the growth of e-commerce within the retail sector's potential crises of value realization resulting from slow market growth. As a response to these looming crises, I argue that e-commerce is commoditizing delivery and re-organizing the social reproductive labor of shopping. This means that online shopping sells the delivery of a good as much as the good delivered. To profit from this commoditization, retailers have had to restructure their warehousing and delivery work. I draw on nine months of fieldwork in central New Jersey to demonstrate that this restructuring depends on a feminization of warehouse labor, based in degrading those performing this work, and utilizing hyper-taylorist modes of repressive labor control. In contrast, delivery work has remained largely masculinized and controls labor much more through the generation of consent rather than repression. I conclude by arguing that a gendered production of flexible labor is constitutive to retail market (re)construction, and that this is significant because it creates avenues for labor to make political claims on markets themselves, in addition to the profits of retailers.

Sasha N. Lower, lowers19@up.edu, *University of Portland*; **Abigail Kessi**, kessi18@up.edu, *University of Portland*; **Isabella Neuzil**, neuzil18@up.edu, *University of Portland*; and **Ted C. Eckmann**, eckmann@up.edu, *University of Portland*. **Economic**

Valuation of Large Coniferous Trees in Urban Areas. This study was conducted in response to plans by administrators at the University of Portland (UP) in Portland, Oregon, to cut down eight giant sequoias, *Sequoiadendron giganteum*, to make room for the construction of a new academic building on the UP campus. In an attempt to save these sequoias, we calculated the effects of these eight trees on building energy savings, in addition to removing air pollutants such as CO₂, O₃, SO₂, NO₂, and PM_{2.5}. We then calculated the associated reduction in healthcare costs and missed work days due to the amounts of air pollutants removed by these trees. We also calculated the economic value of these trees in carbon storage and carbon sequestration. However, our results show the largest economic benefits of these trees are in the form of improving hydrologic stability. In response to the efforts of co-authors of this study, and others in the UP community, UP administrators agreed to only cut down four giant sequoias instead of the eight originally planned. Our economic modeling suggests these efforts to save the trees therefore saved UP over \$700,000 in direct costs from increased energy bills, air pollutant exposure, and hydrologic problems, which would have occurred if UP administrators had followed their original plan to cut down all eight trees. The modeling framework developed by this study could be applied elsewhere to quantify economic values of other large trees and help decision-makers to better see the value that such trees provide.

Alexander J. Lyon, alyon@nevada.unr.edu, *University of Nevada, Reno*. **Glacial Retreat in Santiago, Chile, and the Cordillera Blanca, Peru, and the Influence on Water Supplies.** Glacial meltwater is critical for some of the functions of ecosystems and human use in regions near glaciers. As glaciers have begun a slow retreat, many systems could be threatened by the possibility of significant reduction in flow. This study examines how the retreat of the glaciers in the Cordillera Blanca of Peru and Santiago, Chile, is affecting water supplies. This study will evaluate and compare both areas, which are similarly supported by and dependent upon meltwater from glaciers. From city to regional scales, a reduction in water supply could have profound effects on growth, land use, and human habitability.

Menary, John A., jmenary@csudh.edu, *California State University, Dominguez Hills*; and **R. Sumner**, rsumner@lbcc.edu, *Long Beach City College*. **Hidden Lives—Affect, Cultural Heritage, Story Mapping, and Gamification in Field Methods and California Geography.** The quest here is to offer some guidelines for using case studies to help social studies teachers integrate affective methodologies with ideas from story mapping and gamification. Field Methods and California Geography instruction within the current social studies credential curriculum is, at best, variable among and within higher education institutions. Building on a prior case study, Hidden Lives, designed within an existing field methods class offered at Long Beach City College, discussed is the use of a story map illustrating the everyday life of Southern Califor-

nia's late-eighteenth-century, privileged Rancho culture, while also exploring issues of cultural landscape and cultural heritage. Originally found lacking was an affective methodology to help explain cultural heritage issues. Herein discussion centers on the "practices" shaping cultural heritage decision-making applied to the choice of a Rancho cultural history. Injected was an appreciation of an active affective role for "sense of place." But from where does such affection arise? One source is gamification. Designed for university instructors using Active Learning Experience, the guidelines might both encourage greater inclusion of Field Methods and California Geography in the Social Studies curriculum and enhance student practice and performance.

Dianne Meredith, dmeredith@csum.edu, *California State University-Maritime Academy*. **Maritime Issues from Land-Based Perspectives: Teaching the Indian Ocean Rim.** In the Global Studies and Maritime Affairs major at the CSU-Maritime Academy, students prepare for future careers related to ports, maritime security, and other ocean-related activities. While Atlantic and Pacific Ocean perspectives are commonly foundational, the Indian Ocean has received less attention in international affairs. Given the paucity of information about this large ocean space, a student-centered course was created using the pedagogy structure of reading circles, with participants alternating roles of discussion director, summarizer, luminary, questioner, and connector, examining key readings on Indian Ocean history, environmental patterns, maritime security, and relations between major powers. The primary challenge was to shift perspective from littoral-rim concerns to the ocean itself. Focusing on this challenge through the reading circle approach resulted in high attendance, good student engagement, outstanding course research papers, and, in the following year, several Indian Ocean-related senior theses.

Lidia Mezei, lmezei@nevada.unr.edu, *University of Nevada, Reno*. **Heritage and Nationalism in Hungarian Ethnic Religious Revival.** This study examines the Hungarian ethnic religious revival of ősmagyar vallás in the context of the nationalistic sentiments that are used to back the religious renaissance and the ideas—foreign in origin—that led to the development of the original movement. My objective is to explore the evolution of this contemporary socio-religious movement in order to better understand how these two seemingly contradictory elements of heritage (nationalism versus traditional religion with seemingly foreign aspects) not only co-exist, but have helped justify ethnocentrism and xenophobia in Hungary in the past decades. This study examines Hungarian politico-religious history in the past two millennia; the elements of Hungarian ősmagyar vallás and the degree to which they can be deemed to originate from forces considered today to be foreign; the contemporary international and domestic issues that have led to increased nationalism within the country; and the role of ősmagyar vallás in the manifestations of increased nationalism in contemporary Hungary.

Helen Mino Faulkner, helenmino13@gmail.com, *University of Nevada, Reno*. **Understanding the Quality, Price, and Distance-to-Store for Yellow Onions.** This study examines the price per pound of a yellow onion for the consumer and how it relates to both the quality of the onion and the physical distance it travels from farm to store. This study focuses on grocery stores in Reno, Nevada. The objective was to determine whether there is a correlation between the price to the consumer and how far the yellow onion must travel to the consumer. The quality of the onions was also determined by USDA standards. I expected to find that the price to the consumer is based on what they are willing to pay and the perceived quality, not the actual quality or physical distance traveled. The results from this study can let consumers know more about the relationship between the quality of onions, prices, and distance traveled by onions. This provides a better understanding of how local food systems and conventional food systems play a role in the pricing and quality of produce.

Annemarie Morach, morach18@up.edu, *University of Portland*; **Anjali Haripriyan**, HaripriyanA@catlin.edu, *University of Portland*; **Audra McNamee**, audramcnamee@gmail.com, *University of Portland*; and **Ted Eckmann**, eckmann@up.edu, *University of Portland*. **Measuring and Modeling Microclimate Impacts of *Sequoiadendron giganteum*.** Administrators at the University of Portland (UP) in Portland, Oregon, had planned to remove eight giant sequoias (*Sequoiadendron giganteum*) from UP's campus in 2017 for a construction project, but several coauthors of this study were able to provide compelling arguments against this. The UP administration thus agreed to cut down only four sequoias instead of the eight originally planned. Although we attempted to save all eight trees, this compromise provided an opportunity to measure how sequoias influence microclimates, with a goal of quantifying their roles in mitigating urban heat island (UHI) effects, and thus promoting protection of these and similar trees everywhere. Our study applied a widely used computational model called ENVI-met to isolate effects of sequoias on microclimates, and validated results by making field measurements before and after UP removed the four sequoias. Our study is likely the most thorough to ever measure and model microclimate effects of sequoias, or potentially any other large trees. Results show model simulations of plant metabolic processes and their influence on air temperature, surface temperature, winds, and carbon dioxide were close to measured values, with an r^2 for many parameters at or near 0.99, and other statistics ranking model performance comparable or superior to previous ENVI-met studies. Applications include new methods for running and validating microclimate models, which could lead to better decisions about what kinds of trees to plant where, and greater protection for trees, which can reduce the UHI effect and its detrimental influences on energy demand and human comfort.

Alexander B. Murphy, abmurphy@uoregon.edu, *University of Oregon*. **Promoting Environmental Sustainability in Megacities: Geographical Considerations.** Geographical perspectives and techniques have an important role to play in efforts to promote environmental sustainability in megacities. Taking geography seriously means focusing attention both on the physical and human interactions found in particular places and on the spatial organization of phenomena on Earth's surface. The first of these encourages thinking about the types of urban development projects that are in keeping with the environmental context within which they are situated. The second draws attention to the types of urban arrangements that can promote sustainability, as well as the usefulness of geospatial technologies for analyzing those arrangements. Recent geographical work on urban-environmental matters points to the importance of (1) prioritizing projects that are sensitive to local environmental circumstances and limitations, (2) creating and empowering governance units with authority to deal with environment and planning issues in regions that transcend traditional municipal jurisdictional boundaries, (3) thinking systemically, rather than individually, about infrastructure priorities, and (4) taking increased advantage of geospatial technologies in planning and environmental assessment.

Kerri Jean Ormerod, kormerod@unr.edu, *University of Nevada, Reno*; and **Leann Silvia**, lsilvia@nevada.unr.edu, *University of Nevada, Reno*. **Newspaper Coverage of Potable Water Reuse at Orange County Water District's Groundwater Replenishment System.** Water planners in water-strapped communities across the western U.S. increasingly consider potable water recycling an important water-management strategy. Although potable water recycling can increase an otherwise limited urban water supply, the threat of public and/or political opposition looms large. This paper examines newspaper coverage of the most widely celebrated potable water recycling project in the world—the Groundwater Replenishment System (GWRS) in Orange County, California. The case study examines the coverage of GWRS contained in local, national, and international newspapers during an era of significant investment and repeated expansion. Despite the potential controversy associated with potable reuse, the newspaper coverage of GWRS 2000–2016 was largely positive, or simply banal. Generally speaking, the coverage was favorable and embraced infrastructure and technology as key to developing new water resources while protecting public and environmental health. Although potable water recycling is presented as an innovative solution capable of solving several problems at once, the analysis also reveals that recycled water may not fulfill the promise of an uninterrupted urban water supply.

John Phillips, jbpillips@nevada.unr.edu, *University of Nevada, Reno*. **Economic Success in the Basque Country in Modern History: The Case of Mondragon Corporation.** Recent history shows economic success throughout the autonomously governed Basque Country, as evidenced by lower unemployment rates, expanding

corporations, and a higher per capita GDP, as compared to Spain and many other countries in the European Union. This study examines the economic advantage that Basque Country has and the economic differences in comparison to Spain. Analysis of the Mondragon Corporation will give depth and specific insight into these differences due to its unique business model and philosophies that now are gaining popularity throughout the region. This analysis starts with a brief explanation of the fiscal independence of the Basque Country, then provides data and statistics to illustrate the economic advantages and successes of the Basque Country in comparison to Spain. This concludes by speculating on the efficiencies of cooperative business models in the region and how they contribute to the success of the whole.

Lorne Platt, laplatt@cpp.edu, *California State Polytechnic University, Pomona*. **The Natural Rhythms of Urban Space: Skateboarding the Asphalt-Banked Schoolyards of Coastal Los Angeles (1975–1979)**. In the 1970s, the asphalt-banked curves of schoolyards across the coastal plain of Los Angeles created the opportunity for a youth-driven interpretation of both nature and the built environment. Engineered playgrounds were a response to the varied topography of the canyons and plains that abutted the Santa Monica Mountains. This paper examines the ways in which pioneering skateboarders of this era reacted to, and exploited, the capital-intensive urban landscape to create a sport that today has tremendous economic, political, and cultural implications. The analysis focuses on material drawn from *Skateboarder Magazine* from 1975 through 1979. Ultimately, the skateboarders and those who documented their emerging practice express deep awareness and understanding of urban space as influenced by nature's mechanics. The asphalt-banked schoolyards of Los Angeles provided an unintended playground for skateboarders and served as a starting point for the modern era of the sport.

Brian Pompeii, bpompeii@calpoly.edu, *California State Polytechnic University, San Luis Obispo*. **Revealing Political Vulnerability in the Wake of the Great California Drought: Tulare County, California**. This paper explores the limitations and successes of the institutional and nongovernmental response toward vulnerable populations, recovery, and unmet needs in East Porterville, California, during the Great California Drought. Recovery and unmet needs are documented through an exploration of how already vulnerable populations experience a creeping hazard like a drought, how households respond to loss of water access, and how that change in access impacts day-to-day life. In California, a majority of the inequalities regarding access to water are rooted in a history of power, capital, and politics (Reisner 1986). Historically, this inequality has rendered itself as a type of political vulnerability for immigrant labor in the agriculture industry (McWilliams 1935). During the Great California Drought, the physical exposure of the drought was funneled to those least able to seek assistance, respond, and cope. This article details how

the funneling of severe drought exposure magnified the already existing socio-environmental inequalities of poor Mexican immigrants living in rental housing reliant on private groundwater wells. The socio-environmental risk regime in the SJV involves economies dependent on groundwater, a limited understanding of groundwater availability and usage, and a disparity between who is benefiting and who is neglected in this current water provision paradigm. This research asks, "How does changing access to surface water and groundwater in Tulare County, California, impact socio-environmental conditions, and how do those conditions change during exposure to an exceptional drought?"

Richard Price, richardjprice3@gmail.com, *University of Nevada, Reno*. **Luminosity's Unseen Danger: The Relationship Between Artificial Light and Cancer in Humans.** This study examines spatial patterns between light saturation in the environment and breast and prostate cancers in humans. With every new road, house or park built, light pollution potentially increases. The effects of increased urbanization on astral gazing and the creatures who share the planet with us is well documented. The unmitigated amount of saturation in most areas of the world in artificial light has led to research that suggests a serious problem for various animals, such as migratory birds, sea turtles, and bats. Given these detrimental effects to animals, the question arises as to what is happening to humans with the brightened night skies' potential to influence circadian rhythms. The objective of this study is to examine relationships between rates of breast and prostate cancers and increased exposure to artificial light, first by contrasting regions with differing amounts of artificial light, then within a region by paying particular attention to rates for the urban populace, night-shift workers, blind people, and the rural populace.

Sean J. Pries, sjpries@ucdavis.edu, *University of California, Davis*. **"The Past is the Key to the Present" Landscape of the Upper North Fork American River.** One means of studying the landscape of a region is to examine the affective qualities of the way the place has been represented through time. Representations affect our perceptions of and shape our actions within that place. The North Fork American River's headwaters basin ownership structure is a mixture of national forest, properties owned by land trusts, as well as sizeable areas in private ownership and largely managed for conservation purposes. Derived from a larger project seeking to understand the conservation network of the North Fork, in part, as the result of the way it has been represented through time, this is an attempt at a posthumanist political ecology of the landscape of the North Fork American. During the Gold Rush era, maps served as guides to the gold fields and as agents erasing indigenous occupation. Modern maps of the conservation network of the North Fork built on GIS data tell very different stories depending upon what dataset is utilized. These instruments are discussed not only as products of power relations with ecological

consequences but also as landscape agents with the capacity to act and be acted upon. Understanding the cartographic choices that shape their creation is critical, but so too is seeking to grasp the effects these maps have upon our perception, regardless of our knowledge of their origins and creators. Unveiling what historic maps seek to obscure strengthens our ability to interrogate modern creations.

Birendra Rana, brana@nevada.unr.edu, *University of Nevada, Reno*. **A Temporal and Spatial Assessment of Small Hydropower Production, Services, and Values in Nepal**. This study examines spatial and temporal patterns of Small Hydropower (SHP) project development in Nepal and scrutinizes the present situation in the context of Hydropower Development Policy 2001. Hydropower is the conduit for Nepal's sustainable development, and scholars have always strongly advocated construction of more dams. However, the outcome so far has been far from satisfactory, from the point of view of both electricity generation and environmental externalities. To put this in context, the country has not even managed to harness two percent of its technically feasible hydropower potential, and consequently roughly forty-eight percent of its rural population is still living without grid connection. After the World Commission of Dams (WCD 2000) report, the state actively started encouraging SHPs; however, many scholars argue that this alternative pathway may have been unable to make the impact initially envisaged. The objective of this study is twofold: first, to understand the factors that led to the paradigm shift in favor of privately owned SHPs in Nepal; and second, to appreciate the complexities around "spatial distribution" of such infrastructures. It is concluded that "uningrained scientific culture" and governments' "hard path" approach of addressing a natural resource challenge through engineering skills by bypassing the socioenvironmental concerns ensured this paradigm shift.

Elizabeth Ridder, eridder@csusm.edu, *California State University, San Marcos*. **Past, Present, and Future of Woody Trees and Shrubs on Cyprus**. This study investigates the past, present, and future distributions of key woody plant species on the Mediterranean island of Cyprus. Presence vegetation data were collected at 658 locations across the island. Ten bioclimatic variables are used to interpolate environmental conditions at each sample locale. MAXENT was used to model the potential distributions for xx woody shrubs and trees. WorldClim data were used to create species distribution maps for 2050 and 2070 and to create species distribution models for the mid-Holocene (ca. 6,000 years ago) and Last Glacial Maximum (ca. 22,000 years ago). Species distribution models allow us to predict the full environmental range in which woody plant species could grow today on landscapes that are heavily impacted by human alterations. Woody plant species growing at the highest elevations in the Troodos Mountains, controlled largely by the temperature, have the smallest modern geographic ranges and are predicted to lose suitable habitat in future model

predictions. Plants growing at mid elevations in the Troodos and Kyrenia Mountains are governed by mean annual temperature and mean annual precipitation. Maxent species distribution models predict geographic ranges under future climate change and for past species distributions in the mid-Holocene, when insolation was greater than today. Woody plants growing at the highest elevations and endemic species are tightly controlled by their environmental variables and may be the most vulnerable to predicted climatic warming.

Marcella A. Rose, marcella.rose.909@my.csun.edu, *California State University, Northridge*. **Utilizing UAS-Derived Earth Observations to Analyze Vegetation Health and Heat-Islands for a Sustainable Campus.** Achieving a sustainable campus will require an efficiency evaluation of current energy and water use. Unmanned Aerial Systems (UAS) equipped with high-resolution sensors offer safe, cost-effective, and innovative approaches to assessing resource usage on the CSUN campus. Climate-controlled buildings can become inefficient, owing to poor air-sealing of windows, doors, and roofs. Imagery derived from CSUN's thermal UAS allows for the assessment of ground surface temperature on a centimeter scale and detects gaps in a building envelope which allows for heat and cooling loss. By capturing thermal imagery of the campus at different times of the day, we are able to identify areas of heat buildup and develop an actionable plan to reduce the heat island effect, leading to a more energy-efficient campus. NDVI (Normalized Difference Vegetation Index) is the commonly accepted scientific method for assessing vegetation health, including response to drought, disease, and inadequately managed irrigation practices. Using NDVI data produced by CSUN's UAS flights, coupled with campus water usage data, we are able to determine the minimal amount of water usage required to effect optimal vegetation health. Collectively, the imagery and data derived from these sensors provide the framework for addressing critical resource use in an urban environment that experiences seasonal extremes of hot, dry summers and cool, moist winters.

Aubrey B. Rose, abrose@peralta.edu, *Laney College*. **Live/Work, Ghost Ship, and Cannabis: A Wildcat Revisits Oakland's Flexible Zones Ten Years After.** This paper reconsiders the faculty presenter's 2006 Chico State master's thesis, rezoning Oakland's industrial districts for live/work lofts, by comparing original findings and expectations with current conditions and outcomes including: the tragic Ghost Ship fire, the subsequent Mayoral Executive Order regarding unpermitted living spaces and special events, and the new cannabis industry.

Noelle Ruggieri, noeller@nevada.unr.edu, *University of Nevada, Reno*. **Examining Gay-Friendly Rankings in the Case of Reno, Nevada.** This study examines how various kinds of organizations rank cities as "gay-friendly" and how these rankings carry significance for residence or tourists of the cities by considering the factors that

go into the rankings such as policies, history, and economics. The criteria used in “gay friendly” rankings will be examined in terms of the target audience, the characteristics of the rankings themselves, and what the rankings hold for the future of cities. The case of Reno, Nevada, will be used to examine the various gay-friendly criteria.

Zia Salim, zsalam@fullerton.edu, *California State University, Fullerton*. **Facilitating Student Research through Campus-Community Partnerships: Case Studies from Undergraduate Urban Geography Courses.** Educational research has shown that active student engagement is one of several critical factors underpinning student success in the post-secondary classroom. Drawing on principles from George Kuh’s work on High-Impact Practices, this paper examines student research in urban geography courses. Specifically, I present three case studies from campus-community partnerships at different scales to demonstrate a model through which student research can be integrated into undergraduate urban geography courses. In this paper, I summarize the student research and results. I then present main themes that emerged from student and faculty reflections on these courses. I conclude with a discussion of the risks and rewards associated with this collaborative model. Under the right conditions, campus-community partnerships can be a valuable catalyst for undergraduate student research and can contribute to active student engagement.

Katherine G. Sammler, ksammler@csum.edu, *California State University Maritime Academy*. **Fog, Clouds, and Rain: Incorporating the Atmosphere into a Hydro-social Framework.** In California, we interact with water at multiple points in the hydrologic cycle as it changes from gas, to liquid, to solid; soaked in by Pacific fog, drinking water from Hetch Hetchy, playing in the Sierra’s snow. Pondering the hydro-social cycle of water raises questions like: Who owns the rain? How is fog managed? Does cloud seeding create a “downstream” effect? Relationships between water and society have become an important focus of research for many social scientists, giving rise to the term *hydro-social*, a theoretical approach meant to emphasize the social constructions and power relations of water. While much attention is paid to certain elements of the hydro-social cycle, other elements remain either understudied or altogether ignored. This research will begin to incorporate the atmosphere into a hydrosocial framework.

Tom Sanchez, tomsanchez@nevada.unr.edu, *University of Nevada, Reno*; and **Robby Schlesinger**, robby Schlesinger@gmail.com. **Spatial Trends in the Flavor Profile of Craft Beers in the Contiguous United States.** This study seeks to identify spatial patterns in the relationship between American craft brewery locations and flavor profiles. Using GIS methods and a robust dataset including IBU (International Bitterness Units) and ABV (Alcohol by Volume) attributes for over 20,000 American beers, linkages between flavor (including beer type and bitterness) and place will

be examined. The study will also explore how demographic factors like population density, median age, and median income impact the beers brewed nearby. As craft beer continues to become a larger part of the beer industry, flavors are becoming more exaggerated and distinct. These distinctive flavors attract some people and avert others. Understanding the geography of this attraction and aversion can help craft brewers and craft beer drinkers position themselves according to their ideal flavors.

Jeffrey P. Schaffer, jeffreypschafter@yahoo.com, *former adjunct professor at five colleges*. **Will the Sierra Nevada's Major Uplift Myth Finally Die?** In the mid-1860s, gold miners tunneled beneath the Stanislaus River's latite lava flow to reach a bonanza. Instead of striking paydirt, they struck out, because the lava buried older volcanic deposits atop a bedrock ridge, not gold-bearing gravels on a canyon bottom. But Harvard's professor Josiah D. Whitney bought their tale and produced a geologic cross-section of never-before-seen evidence, which became the *de facto* type locality for late-Cenozoic Sierra Nevada uplift. His myth grew, each authority embellishing it with perceptions contrary to verifiable field evidence. Today, John Wakabayashi and Jason Saleeby are the authorities in the northern and southern Sierra, respectively, both presenting perceptions contrary to verifiable field evidence. Since 1990, I have been seeking all uplift (and glacial) evidence the authorities have missed. Currently my team has thirty-plus high-precision Ar-Ar dates on basalts and andesites at or near canyon bottoms, with more samples ready to date. Our results show virtually no incision or widening of Sierran canyons during the Quaternary, and generally only a few meters of incision over the past thirty-four million years, when weathering and erosion rates greatly decelerated. Virtually all agree that there was major incision in response to major late-Cenozoic uplift. But if incision was minuscule, so too was uplift.

Mathew C. Schmidtlein, schmidtlein@csus.edu, *California State University, Sacramento*; **Heather Diaz**, diazh@csus.edu, *California State University, Sacramento*, and **Dale Ainsworth**, dale.ainsworth@csus.edu, *California State University, Sacramento*. **A Mixed-Methods Approach to Identification and Prioritization of Significant Health Needs in Community Health Needs Assessments.** The 2010 Patient Protection and Affordable Care Act mandates that non-profit hospitals conduct a community health needs assessment every three years in order to maintain their tax-exempt status. The purpose of these assessments is to identify the health needs of the community served by the hospital so that the hospital in turn can begin to address these needs through their community benefit programs. A critical part of this assessment is the identification and prioritization of the significant health needs of the community. In this presentation, we discuss the development and application of a mixed-methods approach for the identification and prioritization of community

health needs. A novel aspect of this approach is its tight integration of qualitative and quantitative data sources in the health need identification stage, and its reliance on community voice in the health need prioritization stage of the analysis.

Jeff Schwain, jrschwein@gmail.com, *Green DOT Transportation Solutions*; and **Mark Stemen**, mstemen@csuchico.edu, *California State University, Chico*. **Planning Soapbox.** CSU Chico Alumni and other planning professionals will present quick five-minute presentations on the most interesting projects they have worked on, followed by a panel discussion. This session is intended to expose students and attendees to the wide variety of projects worked on by geographers and planners throughout the world. It is also intended to provide insight into the progressive work being done by professionals to improve society and the environment.

Elisabeth J. Sedano, sedano@usc.edu, *University of Southern California*. **Teaching Critical Physical Geography in a General Education Setting: The Case of the Water Planet.** This paper describes a recent effort to bring a critical perspective to an undergraduate General Education course on water. The Water Planet has been offered at USC for twenty years, taught by Bernard Bauer and then John Wilson with the geography department and currently by John Wilson and Elisabeth Sedano with USC's Spatial Sciences Institute. Since its inception, the course covered the basic topics in hydrology and briefly considered the role of water in human society. This paper describes the current instructors' work to integrate the social dimension of water with its physical patterns and processes. The discussion is situated within recent literature on critical physical geography. A range of scholarship argues that humanity's deep impacts on environmental processes now make a tidy separation between physical and social sciences untenable. Critical physical geographers integrate the physical and social in conceiving of their object of study and draw on social theory and ideas of politics and power in their analyses. Calls for critical physical geography cite the need for critical pedagogy in shaping the next generation of physical geographers. This paper broadens the call to a wider range of students, including undergraduates who may take only one physical geography course in their academic career. This paper discusses challenges to teaching critical physical geography, such as content requirements for general education classes, and describes changes in the curriculum, assignments, and presentation of The Water Planet that bring a critical approach to the class while meeting these challenges.

William Selby, wselby@smc.edu, *Santa Monica College*; **Rob O'Keefe**, rokeefe.gis@gmail.com; and **Jing Liu**, Liu_Jing@smc.edu, *Santa Monica College*. **Your New California Geography Website: Improved, Updated, Authoritative.** We have improved and updated the authoritative website to include just about anything you wanted to know about the geography of California. Geographers Rob O'Keefe (website creator)

and Jing Liu have been perfecting this informative and substantive website that goes far beyond complementing our *Rediscovering the Golden State* text authored by William Selby and published by Wiley (with an updated fourth edition to appear in 2018). You will learn from the latest research and discoveries that include story maps, field trips, current events, and scholarly inquiries about the places, people, and events that make California such a diverse and powerful state. We are tuned in to California's pulse. Find out how you can join us and contribute to the project, or at least use this valuable resource: <http://www.rediscoveringthegoldenstate.com/>

Jackie M. Silber, jms1272@psu.edu, *Pennsylvania State University*. **Geographic Distribution of STEM Degree Return on Investment.** Over the past decade, U.S. educators and politicians have focused on addressing the workforce deficit in the areas of science, technology, engineering, and math (STEM). However, some recent studies indicate the STEM labor crisis may be overstated. Certain fields and geographies actually show a surplus of STEM workers, promised jobs are in some cases not available, and return on investment is often prohibitively long. The findings of these studies are typically presented in tabular and chart form and are categorized by major grouping (e.g., engineering, physical sciences, etc.). My project attempts to inform the STEM debate by providing a Web app to explore the geographic distribution of employment opportunities and salary return on investment (ROI) for a wide array of STEM majors. Data from the Bureau of Labor Statistics and the National Center for Education Statistics were compiled to calculate the approximate number of years it will take to earn back the total tuition cost. This presentation will discuss the data and technologies used to build the app and demonstrate how potential users (e.g., college-bound students and policy makers) can use the interactive maps and charts to better inform their decision-making.

Terry Simmons, terry@environment-lawyer.com, *Center for Global Policy Studies*. **Constitutional and Spatial Dilemmas for Free Speech on Campus.** Free speech is guaranteed in the First Amendment of the United States Constitution. "Congress shall make no law... abridging the freedom of speech, or of the press." Government may not regulate or prohibit the contents of speech; however, United States Supreme Court decisions describe various "time, place and manner" limitations. One may not shout "Fire" in a theater. Speech is not spoken word alone. Symbolic speech is protected. Publishing *Playboy Magazine* printed without pictures, and burning the American flag in protest are protected acts also. Ultimately, protecting unwelcome or obnoxious speech guarantees freedom of speech for all. The remedy for unwelcome speech is more speech in rebuttal. Universities provide many diverse services for students, faculty, and staff. Often universities look and feel like large public bureaucracies with multimillion-dollar budgets because they are. Nevertheless, vigorous, productive institutions of higher education thrive because they are first

and foremost communities of scholars on campus and during Geography conferences. Intellectual engagement requires respect, self-discipline, civility, and tolerance of competing ideas, academic traditions, ideologies, and priorities. Free speech may be diverse, unpleasant, even hostile or polarized. A major national newspaper characterized a recent brawl on the Berkeley campus as the start of the college riot season. Violence and civil disorder can be very counterproductive and expensive. Free speech and academic freedom are core values. One is not possible without the other. Free speech is not free.

Logan K. Simpson, simpsonl18@up.edu, *University of Portland*; and **Ted C. Eckmann**, eckmann@up.edu, *University of Portland*. **Computational Modeling of Industrial Odors in Portland, Oregon, Using AERMOD.** Our previous yearlong measurement campaign suggested the primary source of industrial odors in the University Park neighborhood of Portland, Oregon, was the Daimler Trucks North America (hereinafter Daimler) manufacturing plant, but these measurements occurred only at nineteen discrete stations and only at certain times of day. Computational models such as AERMOD can use meteorological and terrain data to simulate air pollution for times and locations where no measurements are available, so we used AERMOD to further explore odors in this area, using our measurements to validate AERMOD output. We also ran hypothetical scenarios with AERMOD by creating simulated pollution from other potential sources in the area to test the hypothesis that Daimler is the primary source. AERMOD runs using Daimler as the only source closely matched the measurements from our previous study, indicating AERMOD simulated pollution spreading in the area well, and further suggesting that Daimler is a source of the observed odor. None of our model runs using the other hypothetical odor sources could reproduce the spatiotemporal odor patterns we measured. Our hypothesis that Daimler is the primary odor source thus survived all tests. Few previous studies, if any, have investigated industrial odors using this combination of yearlong measurements, validated dispersion modeling, and hypothetical other pollution sources. The new methods developed by this study could also be applied to other areas where sources of industrial odors are difficult to identify, or must be demonstrated to be culpable to a very high level of confidence, such as for regulatory or legal reasons.

Ajay S. Singh, Singh@csus.edu, *California State University, Sacramento*; and **Francis Eanes**, fenes@bates.edu, *Bates College*. **Communicating the Uncertainty of Climate Change to a Skeptical Population: An Examination of Aleatoric and Epistemic Uncertainty and Attitudes Toward Adaptation.** Though agriculture is one of the largest sectoral contributors of greenhouse gases, it is also one of the most vulnerable to future climatic shifts. Global climate change poses significant challenges to future agricultural production, with significant implications for global food security,

agricultural producer livelihoods, and environmental degradation. Over the next thirty years, climate change could have large impacts on agricultural productivity, due to a high likelihood of an overall warming trend, increased nighttime temperatures, increased frost-free days, increased frequency of extreme weather events, and more variable precipitation. Since increasing farmers' adoption of climate-adaptive practices predicated in part on outreach and education, recent research has explored how farmers seek out, process, and act on climate change-related information. Arbuckle et al. (2013) found two-thirds of farmers believe climate change is happening, but only eight percent ascribed it to anthropogenic causes. Morton et al. (2017) observed that almost ninety percent of Corn Belt farmers perceived there was too much uncertainty to warrant changing management strategies. Understanding these nuances of farmers' climate change uncertainty has arguably broad ramifications for how targeted outreach and education strategies are constructed and delivered, and whether farmers sufficiently adopt climate-adaptive measures to achieve food security. We will present broad-scale survey data of Corn Belt farmers' perceptions of two core dimensions of climate change uncertainty to investigate differences in farmers' beliefs and experience of climate change impacts, and their attitudes toward adaptation strategies. We will conclude with recommendations for planners and policy-makers to help create a resilient food system.

Kevin P. Sinnott, ksinnott29@gmail.com, *University of Nevada, Reno*. **Increased Temperatures and Wildland Fires in Alaska.** This study looks into the connections between increased wildland fires in Alaska and rises in temperatures. With an increase in global temperatures, the arctic regions are showing a faster increase than the rest of the globe. These areas are also important because they contain large quantities of carbon that is being released into the atmosphere with wildland fire. This increases greenhouse gasses and also decreases air quality for large populations. As wildland fires grow larger and more frequent, there is also an increase in destruction of large tracts of boreal forests. The study examines the correlation between recorded increased temperatures in Alaska and the increasing number of wildfires. Data on Alaska's fire history and climate history will be used in this analysis.

Betty Elaine Smith, besmith@eiu.edu, *Eastern Illinois University*. **Early Planning and Construction of Historic Ponderosa Way Firebreak and Truck Trail.** Based on original memos, articles, maps, and government documents stored in boxes at the California State Archives in Sacramento, this paper describes the early inter-governmental planning for what is known today as Ponderosa Way. Planned and constructed in part by the State of California as a work program during Depression years and later by the Civilian Conservation Corps (CCC), this trail/road/firebreak was originally proposed to run 800 miles north to south along the western slopes of the Sierra Nevada Mountains. Beginning north of Lake Shasta and extending south

to the Lake Isabela region east of Bakersfield, Ponderosa Way ranges in elevation between 1,800 and 3,200 feet above sea level. Portions exist today as paved and unpaved roads and some parts were never constructed. In addition to the CCC, early planning and construction of this defensive transportation route involved the Department of the Army, U.S. Forest Service, the California Department of Forestry, and local counties. I say “defensive” because it was designed not only to protect the valuable pine timber from brush fires starting in the hills and valley below, but was also of interest to the Army when planning a defense in the event of a West Coast invasion by Japanese during World War II. This is part of a larger project involving field work and local interviews. By integrating knowledge through archival research, this paper proposes to better understand, share, and preserve the little-known geographic history of Ponderosa Way.

Zachary P. Sugg, zachary.sugg@stanford.edu, *Stanford University*. **Understanding the Role of Water Resource Decision Support Tools for River Management and Aquifer Recharge in the California Central Valley Project.** The fragmentation of, and inadequate access to, water data poses one challenge to achieving more sustainable water resources management and governance in California and elsewhere. In response, a shift is occurring toward more open access to water data, along with new tools to help managers aggregate and analyze the data in useful ways. However, the efficacy of such tools and their role in changing long-term management decisions are rarely assessed and not well understood. This study uses meeting observation, semi-structured longitudinal interviews, and quantitative metrics to trace the development and implementation of two Web-based decision-support tools: one to assist interagency water-temperature management of the Sacramento River, and one to assist the Madera and Tulare irrigation districts in the Central Valley with managed aquifer recharge. The study goal is to evaluate whether and how improved access to water data and analytics leads to more-effective management decisions (i.e., more timely, efficient, informed) in these different contexts. Do these tool change management decisions, and if so, how? Who uses them, and how do uses vary between users? What constrains these tools’ functionality and utility to the users? Preliminary findings thus far pertain to the importance of (a) the process of developing open data analysis tools, and (b) political limitations associated with adoption and implementation in complex decision-making arenas.

Ray Sumner, rsumner@lbcc.edu, *Long Beach City College*; and **John Menary**, jmenary@csudh.edu, *California State University, Dominguez Hills*. **Surprises in Fieldwork.** The practice of fieldwork by an introductory Field Methods class seems necessarily to be based on the concept of knowledge in space. We take students “out there”; they apply skills, gather data, and then return into an instructional space to produce a report. In this standard working method, decisions and choices proceed in linear

fashion. As recent focus we chose the Los Angeles River, and then determined sites where students could practice the requisite skills and develop a product. Fieldwork always holds the potential for surprise, however, a place for the unpredictable; and indeed, one place opened whole new horizons to both students and instructors. The surprise provoked a shift in direction, including new problems and concepts previously unanticipated. Instead of landscape change and culture, we examined larger questions of inclusion and exclusion, ethnic marginalization, the right to the city, living cultural landscapes, heritage and privilege, and power relations in urban spaces. The results of this enquiry showed the benefits to be gained from a more open-ended process and highlight the potential in the uncertain nature of fieldwork. The beauty of fieldwork can lie in its unpredictability, in its ability to generate surprise.

Zackery Thill, zackeryt@uoregon.edu, *University of Oregon*. **Constructing Scales and Contesting Science: Environmental Monitoring in Northern Alberta.** Our understanding of local and regional ecosystem conditions often come from state-run ambient environmental monitoring programs, which track the long-term health of water, air, and biodiversity. These programs, largely conducted by government environment agencies, are intended to contribute to dialogue on acceptable tradeoffs between development and pollution. Using the Alberta oil sands environmental monitoring program as a backdrop, this paper builds from political ecology scholarship on scale to contribute to better understandings of how scientific explanations of the environment provide a platform to build and contest scale, and how these scalar dynamics affect Indigenous rights. In the past decade, scale scholarship has become cognizant of the need to build more-complete conceptualizations of how scale is made, stabilized, and contested, especially with regard to the intersection of capital accumulation and race, identity, and settler-colonialism. With this theory in mind, I argue that these programs have done more than provide snapshots of environmental health. Ambient monitoring agencies have been a site for unfolding indigenous-state relationships, circumscribing first nations' decision-making on resource development, and shaping dominant views of environmental health in the region. I conclude by arguing that politicization of monitoring has resulted for two reasons: first, that the monitoring has neglected to meaningfully integrate Indigenous communities in the knowledge-making process, therefore producing science that doesn't speak to their concerns; and second, that there is a lack of institutions where Indigenous communities can voice their concerns or have land and territorial rights protected.

Tera B. Trujillo, tera.trujillo.682@my.csun.edu, *California State University, Northridge, Institute for Sustainability and CSUN Geography Department*. **Knowledge that Grows: Educational and Sustainable Food Production and Waste Reduction on Campus.** California State University, Northridge, has pledged that by the year 2040 it will be a zero-waste campus, and one of the ways that is catapulting the university

into action is through the Institute for Sustainability's Food Garden and Compost Learning Center. It is a student-run program, and its mission is to educate and reconnect students to their food systems along with learning sustainable waste management. Here, students and other volunteers learn first-hand about the importance of closing the gap between food waste and food production. Students spend time learning about the importance of green space in urban areas and seasonal foods, all while living in an industrialized food web. During the year 2016, this program diverted almost 58,000 pounds of pre-consumer food waste, and then used that waste to generate organic food. By learning how to recycle food waste, turn it into nutritious soil, then grow and harvest organic foods, students are able to spread this knowledge to their friends, family, and communities. This expanding project serves a wide cross-section of classes each semester, which gives students from different majors a chance to learn the significance of sustainable food practices. It is vital to continue the growth and success of these educational opportunities because many people suffer from food insecurity in the surrounding Los Angeles area. By training volunteers about the value and prosperity of creating a sustainable urban garden, it is hoped the new educators will carry their knowledge to their neighborhoods and create more access to nutritious foods.

Joe L. Walker, walkerjo18@up.edu, *University of Portland*. **Forecasting Air Pollution Using K-Nearest Neighbor and Genetic Machine Learning Algorithm.** Data mining algorithms have proved to be very effective for discovering useful information in massive datasets, especially in the medical and financial fields. Weather forecasting is well suited for data mining classification approaches since metrological datasets are naturally high volume. Developing deterministic physics-based air quality models for localized microclimates has always been challenging due to the complex interplay between the local geography and atmosphere. It is desirable to develop a fast, simple, and effective air-quality forecast model that can easily be customized to local climates. This paper explores a statistical approach using a K-Nearest neighbor (KNN) supervised machine-learning algorithm to recognize patterns in meteorological conditions that are predictive of a particular air-quality class, which are air pollution occurrences and non-occurrences. In order to do this, it is critical to remove irrelevant features from the dataset, which prevent the classifier from effectively distinguishing the classes, which ultimately results in a less accurate forecasting model. In this study, the optimal subset of meteorological features for predicting significant odor events is determined through the use of a genetic algorithm (GA), a commonly used algorithm for searching large, multimodal state spaces. The utility of a subset of meteorological information is determined by a skill score outputted by the KNN. Leave-one-out cross-validation demonstrated the methods developed by this study to be highly effective in forecasting air pollution.

Kylie Warne, kwarne@nevada.unr.edu, *University of Nevada, Reno*. **The Influence of Rising Temperatures in the Arctic Sea on Narwhals**. This study examines how rising oceanic temperatures are affecting the narwhal population in the Arctic Sea. Narwhals are near to the level of threatened, which means they could be extinct in the not-too-distant future. This study relies on information from scholarly academic journals and environmental agencies and organizations. With increasing oceanic temperatures during summer months, Arctic sea ice is rapidly receding to its lowest extent. The sea ice serves as a shield from predators. The dramatic reduction of sea ice makes narwhals more vulnerable to predators, due to the lack of protection. Increasing open oceans also lead to more human activity and boat traffic, which have a negative effect on the narwhal population. Examining the influences impacting the narwhal population can help predict the risks toward narwhals and contribute to well-targeted conservation efforts.

Micah C. Wright, mcw11@humboldt.edu, *Humboldt State University*; **Rosemary Sherriff**, *Humboldt State University*; and **Amy E. Miller**, amy_e_miller@nps.gov, *National Park Service*. **Warming Temperatures Induce Shift in Productivity for White Spruce Across an Ecological Gradient in Southwest Alaska**. The effects of warming temperatures on the growth of Alaskan white spruce (*Picea glauca*) vary along longitudinal gradients, where trees at warmer interior sites exhibit negative growth response to high temperatures, and trees at cooler western sites exhibit positive responses. However, less is known about how tree- and stand-level competition influences these growth-climate relationships. We used annual ring width data from 851 trees distributed between twenty-six long-term study plots to investigate whether the relationship between the growth of white spruce and climate varied with competition across a three-degree longitudinal gradient in southwest Alaska. While our results corroborate previous findings concerning the effects of warming temperatures on growth across broad ecological gradients, they also suggest that stand-level competition may mediate this effect. Specifically, the effects of increased temperature on growth were negative in stands with higher basal area (i.e., forest ecosystems), while high temperatures produced positive effects in stands that were less populated (woodland ecosystems). Our analysis also indicated that these effects were not uniform across space, namely, the positive effect of high temperatures on growth was predicted for only those stands located in the eastern boreal region. While we observed a negative relationship between tree-level competition and growth, we found no evidence that tree-level competition influenced growth-climate relationships. These results suggest that high-density forests in this region may be at an ecological tipping point: as temperatures increase beyond critical thresholds, areas that were once highly productive may no longer support high-density forests.

Terence Young, tgyoung@cpp.edu, *California State Polytechnic University, Pomona*. **“The Most Elaborate and Valuable Apparatus”: Transnational Politics and the Linking of Canadian and American Park Agencies.** During the early twentieth century, Canada’s national parks agency—what today is known as Parks Canada—introduced a slowly expanding array of American approaches into the management of its protected areas, but US National Park Service (NPS) policies, practices, and plans were but lightly influenced by Canadian thinking. The relationship was largely a one-way flow, albeit a small one. In the fifteen years following World War II, the pre-war situation changed little. Canadian national parks continued to grow increasingly like American ones. Parks Canada occasionally sent representatives south for site visits and peppered the NPS with written queries about how the Americans managed infrastructure, resisted resource extractors, identified wilderness, and more, but the Americans almost never looked north for solutions to the issues they faced. However, before the 1960s were out, rapid changes in the political relationship between the United States and Canada would percolate down to both countries’ park agencies, which transformed the flow of information, techniques, policies, and other administrative practices into a sizable, two-way street. This presentation explores the key moments that altered a decades-old relationship and the outcomes that emerged during this transition in the historical geography of North American park management.

Yolonda Youngs, younyolo@isu.edu, *Idaho State University*. **Seeing Nature, Tracing Culture: Repeat Photography, Cultural Landscapes, and River Recreation in National and State Parks.** This study presents a case for the value of repeat photography in historical geography and cultural landscape studies by focusing on rivers of the Intermountain West in national and state parks with different recreation and tourism development histories. The Upper Snake River, in Grand Teton National Park, offers a rich history of outdoor recreation including climbing, dude ranching, hiking, camping, fishing, and river rafting. With more than 70,000 tourists per day floating on commercial trips of the scenic section of the river past the dramatic Teton Mountain range, river recreation accounts for a sizeable economic contribution to nearby communities and a significant tourism impact on the park. Commercial river rafting developed in the western U.S. after World War II as new technology and surplus from the war efforts combined with an outdoor recreation and economic boom. These social, technological, and economic changes shaped the cultural landscape of the river through the development of river access areas and boat ramps, river channel toponyms, and park transportation networks. Each of these features is captured in sets of historic and contemporary photograph pairs that, when analyzed together, reveal a distinct signature of river recreation landscapes. To contrast these patterns, this study also presents a comparison of repeat photographs of city parks along the Portneuf River, a tributary of the Snake River in southeastern Idaho. The

findings from this study suggest that repeat photography provides an effective way to visualize cultural landscape change and recreational landscapes in public lands and rivers of the western U.S.

Yi Yu, yyu2@uoregon.edu, *University of Oregon*. **Providing Institutional Home for the Elderly Through Public-Private Partnership—A Case Study of Community Eldercare in Shanghai, China.** This project investigates the mechanisms through which particular caring spaces are promoted, institutionalized, and implemented by the Chinese government through public-private partnerships. Facing a large aging population, China's need for eldercare has become a severe social problem, and the country's eldercare landscape is undergoing major shifts. Traditional in-home care for the elderly is gradually eroding with rapid urbanization and decreasing family size (The Lancet 2016). At the same time, aging in institutions is stigmatized by associations with loneliness, unfilial children, and bad care practices. As a result, the Chinese government is actively collaborating with non-government organizations (NGOs) to promote community care comprised of private homes and community centers, forming an institutional home. In this project, I ask "How does the Chinese state collaborate with companies and NGOs to establish institutional homes for eldercare in cities?" Drawing on six months' ethnographic research conducted in 2017, I discuss and analyze the collaboration and negotiation between Chinese government and non-profit organizations in providing eldercare services to promote desired aging processes, such as aging in place and healthy aging. This project contributes to the understanding of state-society and social welfare regimes in China.

Poster Abstracts

Joel Adams, adamjoel@isu.edu, *Idaho State University*; and **Yolonda Youngs**, younyolo@isu.edu, *Idaho State University*. **Rivers Across Time: Cultural Historical Landscape Change and Outdoor Recreation of the Portneuf River, Idaho and Upper Snake River, Wyoming.** This project traces the cultural and environmental evolution of two rivers from 1950 to today through a repeat photography and cultural landscape study. The Upper Snake River leaves Yellowstone National Park, then meanders through the wide, open valley of Grand Teton National Park in northwestern Wyoming. It is a recreational hotspot for rafting, fishing, and scenic tourism, with a complex history of land use and management. Across the state line of Wyoming and Idaho, the Portneuf River, a tributary to the Snake River, flows through the heart of Pocatello, Idaho. Residential development and river management strategies, including channelization to control flooding, impose a cultural signature on the Portneuf River that leaves visible vestiges of historic landscape change. In the arid West, rivers such as the Snake and Portneuf tell important stories about shifting ideas of resource management, agriculture, and recreation. This study employs repeat photography, archival research, and cultural landscape interpretation to better analyze and visual-

ize historic landscape change along these two interconnected yet very different river corridors. Cross-comparison sites for this study focus on boat launch sites on the Upper Snake River and historic buildings and developments on the Portneuf River. The findings from this study may be useful to scholars interested in cultural historic landscape change in the American West, river management, and cultural resource applications of repeat photography methods.

Michael W. Andrews, mwandrews@csum.edu, *California State University Maritime Academy*; **J. Anthony Koslow**, jkoslow@ucsd.edu, *Scripps Institution of Oceanography*; **Ian Perry**, ian.perry@dfo-mpo.gc.ca, *Fisheries and Oceans Canada*; **Moirá Galbraith**, moira.galbraith@dfo-mpo.gc.ca, *Fisheries and Oceans Canada*; **Janet T. Duffy-Anderson**, janet.duffy-anderson@noaa.gov, *Alaska Fisheries Science Center*.

Coherence in Fish Communities Across the California and Alaska Currents: Principal Component Analysis of Ichthyoplankton Abundance Time-Series.

The waters off Vancouver Island in the Northeastern Pacific serve as a transition zone between the California and Alaska Currents, with several fish taxa shared between regions. Principal component analyses (PCA) of ichthyoplankton time series (2001–2016) from the waters off Vancouver Island, Alaska, and California indicate that the abundance of species shared between Vancouver and California, and Vancouver and Alaska, generally exhibit population trends out of phase with one another. The dominant pattern (PC 1) for Vancouver Island species was positively correlated with sea surface temperature (SST) off California. PC1 for cool-water affinity taxa shared between Vancouver and California showed a strong positive correlation to SST off California and Vancouver, with several taxa off Vancouver responding positively to SST in the California Current (CC) and several off California responding negatively, suggesting that warming temperatures lead to a shift in the North-South distribution of these species in the CC. However, *Lyopsetta exilis* exhibited a coherent response to SST from California to Vancouver. PC1 for taxa shared between Vancouver and Alaska generally also showed opposite trends in abundance for several taxa, but there were no significant correlations with SST or any other of our selected environmental variables.

Dani M. Castillo, castilol19@up.edu, *University of Portland*; and **Ted C. Eckmann**, eckmann@up.edu, *University of Portland*. **Democratizing High-Resolution Ortho-image Generation Using Drones.** This study developed and applied new approaches for using a DJI Phantom 3 Professional quadcopter to acquire high-resolution, visible-wavelength photographs for orthorectification utilizing images acquired both in sunny and overcast conditions, along with methods for using this imagery to measure the albedo of plants. We tested and validated these methods through more than one hundred flights at the University of Portland campus in Portland, Oregon, from 2015 through 2017. Results show the approaches we developed

provide low-cost imagery at substantially better resolutions than other available sources, and the ability to fly under low-altitude overcast cloud decks is effective in reducing the detrimental effects of shadows. In addition, the plant albedo values we calculated through new methods developed by this study match closely with values from the literature for the twenty-three plant species we used for validation, but offer tremendous advantages in speed and spatial coverage as compared to measuring plant albedo through traditional *in situ* methods. Plant albedo is a necessary input for some microclimate models, and can provide useful information about vegetation health and phenology. The approaches developed and validated by this study can be applied in many areas worldwide, and serve to democratize the availability of very high-resolution imagery for a variety of users who until recently could not afford such advanced data products.

Kenia D. Conner, kconner6889@csum.edu, *California State University Maritime Academy*. **Possible Areas for Both Onshore and Offshore Wind Farms in the Hawaiian Islands.** In 2015, Hawaiian Governor David Ige signed into law a bill that would aid Hawai'i's promise of clean and sustainable energy. In this bill, Hawai'i's utilities would have the potential to generate all of their energy using renewables in the next thirty years. This poster will demonstrate the best potential offshore and onshore locations to install renewable energy infrastructure. The state has the potential to greatly benefit from the use of both on- and off-shore wind farms, specifically offshore. Offshore wind farms in the Hawaiian Islands have the potential to generate large amounts of energy that would catapult the islands into being an offshore wind farm, exemplary for the United States.

Michael R. Fischella, mfischella@ucla.edu, *University of California, Los Angeles*. **Investigating the Influence of Climate and Precipitation on Dryland Ecohydrology.** Investigating soil moisture dynamics is fundamental to understanding how the hydrologic cycle influences ecosystem dynamics. This is especially important in environments where water is limited, for our understanding of ecohydrological interactions in these water-limited environments remains lacking—particularly, how the distribution of below-ground biomass, and competition influences the soil moisture rate. Current knowledge regarding soil moisture's influence on the distribution of below-ground biomass is limited, but progress is essential in order to accurately characterize vegetative competition in water-limited environments and gain a greater awareness of dryland ecohydrology. Therefore, developing a numerical model would aid in providing a better understanding of below-ground competition as well as dryland ecohydrology. Through exposing various edaphic and hydrologic inputs to increasing competition, I will assess not only the ecohydrological controls on the distribution of below-ground biomass but also analyze whether soil hydrologic theory can predict the vertical distribution of below-ground biomass in

water-limited environments. This model is based on preceding soil models consisting of two layers, but has been adapted to investigate this three-layer hypothesis. The results from this study affirm that a three-layer soil model provides a more accurate representation of below-ground biomass in drylands than two-layer models. Thus, this model provides a better understanding of how these eco-mechanisms affect the distribution of dryland vegetation, and influence the soil moisture rate.

Mark A. Hedlund, markhedlund@csus.edu, *California State University, Sacramento*. **Geographic Impacts of Sacramento's Fruit and Vegetable Canneries.** Fruit and vegetable canning was a major industry in Sacramento from the 1880s until Sacramento's last large cannery closed in 2013. This study investigated the geographic effects of Sacramento's canneries in agricultural land use, urban land use, and population geography. Evidence of the canneries' impact on agricultural land use was searched for in historic agricultural Census data. Addresses of cannery workers were mapped to determine the canneries' effect on housing location choice. Evidence for influence on the ethnic geography of Sacramento was looked for in the Census and secondary historical sources. The canneries' impact on urban land use was found by comparing historic fire-insurance maps to contemporary land-use and zoning maps. The spatial impacts of the canneries were often subtle but noticeable. The canning industry's period of greatest significance in Sacramento was from the 1920s to the 1970s. This was after orchard agriculture had been established in the Sacramento Valley and after land-use patterns in much of Sacramento had been established. The part-time nature of many cannery jobs might have made the industry less influential in housing location choice. This poster also provides some historical context for the canning industry in Sacramento.

Bethany R. Johnson, brjohnson@csum.edu, *California State University Maritime Academy*. **Environmental Imperialism in the Pacific: A History of the Johnston Atoll.** The purpose of this work is to analyze the environmental impact sustained by the Johnston Atoll and its surrounding areas. In 1942 a group of scientists, politicians, and a handful of military officers created the Manhattan Project and the world's first nuclear bomb. Years later, the United States began using areas of the Pacific Ocean as nuclear testing grounds. The Johnston Atoll was used multiple times as a test site after its status as a wildlife refuge was revoked. Its environment has since then suffered in many of the same ways that other islands used for the same purpose have. This paper moves chronologically through Johnston's history, settling on the atoll's current stance as a marine protected area, ending with recommendations for future nuclear testing and a statement on Johnston's predicted future.

Brendan W. Lawrence, Brendanlawrence@nevada.unr.edu, *University of Nevada, Reno*; and **Jill S. Heaton**, jheaton@unr.edu, *University of Nevada, Reno*. **Determining**

the Spatial Footprint and Intensity of Reno, Nevada's Urban Heat Island. This research project will employ Landsat TM/ ETM+ bands to spatially quantify the Reno-Sparks metropolitan area's surface urban heat island from the 1990s through 2015. The Urban Heat Island (UHI) phenomenon describes a situation in which urban cores and developed areas exhibit higher surface and air temperatures than surrounding, non-developed regions, due to the exchange of latent to sensible heat from human-made surfaces and materials. The intensity, spatial footprint, and impact of the UHIs are of interest in metropolitan areas. As Reno-Sparks continues to grow, future populations will be subjected to increased outdoor temperatures. This poster will detail the first steps of data processing in a larger project relating UHIs to land cover. Landsat images were obtained for the correct day of year, as well as correct time of day, to show a region's UHI at best contrast. These images were then processed from digital numbers (pixel values assigned by the sensor, based on radiance) to a more useful value such as surface temperature. These images are transformed into a "heat-map," which can be compared (visually or statically) with other land cover attributes.

Avishesh Neupane, aneupane@g.ucla.edu, *University of California, Los Angeles*; and **Daniela F. Cusack**, dcusack@geog.ucla.edu, *University of California, Los Angeles*. **Effects of Warming on the Fate of Carbon Across a Hawaiian Soil Mineralogical Gradient.** This research uses soils from three montane forest sites along soil age gradients on basaltic lava flows in Hawai'i to analyze the interacting effects of warming and soil mineralogy on the fate of carbon (C) in tropical soils. Soils were collected from 0–25 cm depths and incubated in the lab at 16°C (ambient temperature), 21°C, and 26°C. New C in the form of ¹³C-labeled glucose and glycine were added to soils to track the fate of C with warming across sites. Carbon dioxide fluxes were measured every fifteen to thirty days for eight months. The youngest soils (Thurston, 300 years old), had the lowest overall respiration; an intermediate-aged soil (Laupahoehoe, 20,000 years old) had the highest respiration; and there was intermediate respiration from the oldest soil (Kohala, 150,000 yrs). Kohala soil showed the largest percentage increase in respiration upon warming, while Thurston showed the smallest increase. Microbial ¹³C data show significant uptake and retention of added substrates in microbial biomass during the first four days of the incubation. Although the retention of glycine in microbial biomass was comparable to the retention of glucose at ambient soil temperature, its retention at warmer temperature was much lower. These results show that warming not only increases heterotrophic respiration of C, but also decreases microbial retention of simple C substrates, and its effect on respiration and retention may be differential even for simple C substrates. These results will improve our understanding of how warming may affect C storage across tropical sites.

Noriyuki Sato, nsato2@csuchico.edu, *California State University, Chico*; and **Chelsea L. Teale**, Chelsea.Teale@humboldt.edu, *Humboldt State University*. **Infusing New Tools into a Climatology Course: American Meteorological Society Climate Studies Diversity Project.** Changing climate impacts socioeconomic activities, agribusiness, and existing infrastructure, which are subject areas that students with diverse backgrounds are studying. Thus, offering a basic climatology course is increasingly important, as it provides students with a firm understanding of climate and the skills to analyze climatic data. In summer 2017, more than twenty faculty members participated in a workshop to learn how to teach a climatology course, using the American Meteorological Society (AMS) Climate Studies package, in their respective colleges and universities. The AMS Climate Studies package, including hands-on exercises with access to the latest data, was made with support from NOAA and NASA. This poster presentation provides information that is pertinent for any faculty member who may choose to use the AMS Climate Studies package to start offering a climatology course. This presentation also offers real-life examples of the implementation of the AMS Climate Studies package in an upper-division course at California State University, Chico. The poster illustrates outreach efforts to recruit more students to the environmental science field.

Panel Discussions

Panel Discussion of Departmental Mergers. Across the CSU and the U.S., geography departments are contemplating and often engaging in mergers with complementary departments. The potential benefits and challenges are many. Our discussion panel will feature short presentations from several colleagues who have undertaken mergers, followed by an extended, audience-centered discussion. Bring your concerns and questions.

Presenters:

Jenny Zorn, jzorn@csub.edu, *California State University, Bakersfield*

Rob Kent, Rob.Kent@csun.edu, *California State University, Northridge*

Bryant Evans, bryant.evans@hccs.edu, *Houston Community College*

Ramin Zamanian, ramin.zamanian@hccs.edu, *Northwest College, HCC*

Jaquelin Chase, JChase@csuchico.edu, *California State University, Chico*

Laura Watt, laura.watt@sonoma.edu, *Sonoma State University*

Organized:

Jeff Baldwin, baldwije@sonoma.edu, *Sonoma State University*

Mark Stemen, mstemen@csuchico.edu, *California State University, Chico*; and **Jeff Schwain**, jrschwein@gmail.com, *Green DOT Transportation Solutions*. **Oh, the Wonderful Things You Can Do with a Degree in Geography.** A panel of alumni from the CSU, Chico Geography and Planning Department will talk about the wide variety of careers they have pursued with their degrees after graduation, followed by

a discussion. This session is intended to expose students and attendees to the wide variety of professions open to graduates with a geography degree.

Panelists:

Dean Fairbanks, *California State University, Chico*

Cheri Chastain, *Sierra Nevada Brewery Co.*

Steven Maxey, *County of Merced*

Susan Forbes, *USDA, Stanislaus National Forest*

Kristina Miller, *City of Corning*

Antoinette WinklerPrins, anwinkle@nsf.gov, *National Science Foundation (Geography and Spatial Sciences)*. **Tips and Strategies in Writing Effective Proposals for the National Science Foundation (NSF)**. This outreach session is intended for faculty members, professional geographers, and graduate students who engage in geographic or spatial scientific research and who wish to learn how to prepare effective proposals for the NSF. A program director from the Geography and Spatial Sciences (GSS) Program at the NSF will discuss research grant opportunities and will highlight ways to improve the quality and competitiveness of a proposal. The session will include details about the review process, including the intellectual-merit and broader-impacts review criteria. Successful awardees will serve as panelists, offering their own insights into the process. Time for Q&A will be provided.

Panelists:

Scott Mensing, *University of Nevada, Reno*