

**FY 2013-14 NRS Annual Report
NEW RESEARCH**

Campus: UC Riverside
Reserve: Sweeney Granite Mountains Desert Research Center
Prepared by: Tasha La Doux

New Projects (12):

Project Title: Determining spread and consequences of respiratory disease in desert bighorn sheep
Researcher(s): Clinton Epps, Anna Jolles, Ben Gonzales
Affiliation(s): Oregon State University, California Department of Fish and Wildlife
Funding: National Park Service
Description: Faculty Research. In response to an outbreak of pneumonia in desert bighorn sheep (*Ovis canadensis nelsoni*) in 2013, this team of scientists is trying to learn more about the disease and assess the severity of the situation. The researchers will use both genetic data and telemetry to monitor animal movement, examine connectivity between ranges, and assess the risk of spread. They will use camera trap data and visual observations to learn more about demographic changes associated with disease outbreak, and will investigate other factors that may be influencing survival and reproduction. RNA, DNA, and immune function testing thus far has revealed that at least one pathogen known to cause pneumonia in bighorn sheep, *Mycoplasma ovipneumoniae*, has spread throughout all nine populations sampled.

Project Title: Digital Narratives
Researcher(s): Norman Locks
Affiliation(s): UC Santa Cruz
Funding: none
Description: Faculty Research. For Norman Locks, Professor of Photography in the UC Santa Cruz Visual Art Department, the Mojave Desert figures strongly in his recent research, which concentrates on the relationship between humans and nature. Locks constructs what he calls “Digital Narratives,” perhaps as photographic representations of environmental and social issues he encounters while contemplating the complexity of the landscape. These photographs, according to Locks, “...are by nature autobiographical – a first person look at being human in the world.” He gathers the photos with his point and shoot camera, reconstructs them into panoramic landscapes in a way that reveals the subtle stories nature hides, as well as the history that humans leave on the environment.

Project Title: The ecology of a complex antipredator trait: tail autotomy in the common side-blotched lizard *Uta stansburiana*
Researcher(s): Chi-Yun Kuo and Duncan Irschcik
Affiliation(s): University of Massachusetts
Funding: The Human Frontiers Science Program
Description: Ph.D. Dissertation. The occurrence of tail autotomy varies greatly among lizard populations. Previous research mainly interpreted this variation as an ecological index for predation intensity, without considering whether this variation reflects the facility of autotomy at organismal level. Only very recently have biologists begun to test whether the facility of autotomy varies in different predation environments. Given that autotomy involves a decision making process, an individual can have a higher facility of autotomy because of a lower threshold stimulus for autotomy. Although individuals from high

predation environments do have lower threshold stimulus for autotomy in a few cases, whether this is the norm in lizards is still unclear. In this study, Kuo is testing whether lizards from high predation environments have a lower threshold stimulus for tail autotomy compared to lizards from low predation populations.

Project Title: An Anthropology of Energy, Ecology, and Competing Cosmologies of Land-Use in the Mojave Desert
Researcher(s): Michael Vine
Affiliation(s): University of Cambridge
Funding: Economic and Social Research Council, UK
Description: Ph.D. Dissertation. In this study, Vine proposes to investigate renewable energy development in the Mojave Desert as a flashpoint for moral calculation and competing cosmologies of land-use in the Mojave Desert. His analysis will address how conservation efforts for threatened or endangered species in the face of existing and proposed large-scale solar energy projects have brought scientists, activists, local communities, and state and federal governments into moments of uneasy alliance and outright antagonism. He is interested in observing how certain entities (for example, the desert tortoise, the desert itself, the climate, the planet) come to matter as things of care, concern, and contestation, and how the idea and objects of endangerment are reconfiguring socio-ecological relationships, practices, and places across multiple scales of sentiment and social life both in the Mojave Desert and beyond.

Project Title: Systematics and Behavior of the Ant Parasitic Genus *Orasema*
Researcher(s): Judith Herreid and John Heraty
Affiliation(s): UC Riverside
Funding: National Science Foundation
Description: Ph.D. Dissertation. The family Eucharitidae is composed strictly of ant parasitoids. The genus *Orasema* is found with Eucharitidae and exhibits fascinating biological and ecological traits. Female *Orasema* place a single egg into oviposition punctures made in plant tissue away from the ant. Mobile first-instar larvae (planidia) emerge and must then gain access to the ant brood through various specialized behaviors. These possible behaviors include using other insects as intermediate hosts, phoretically attaching directly to the ant, being directly picked up by ants or by being in close association to extra floral nectaries that the ants use as food. This research will focus on the different behaviors used to gain access to their ant hosts, along with an examination of host plant and ant choice selectivity to help improve the understanding of this unique genus in both an ecological and phylogenetic context.

Project Title: Pollinator-driven evolution of floral traits in *Salvia* subgenus *Audibertia*
Researcher(s): Daniela Klein, Regine Classen-Bockhoff
Affiliation(s): University of Mainz (Germany)
Funding: Deutsche Forschungsfoerdernde Gesellschaft
Description: Ph.D. Dissertation. The focus for this research is studying pollinator-driven evolution of floral traits in *Salvia* subgenus *Audibertia*. This group of plants provides a unique model system to study the functional significance of the staminal lever mechanism, a morphological trait that has evolved with bee pollination. Most *Salvia* species are bee-pollinated and therefore have a functional lever mechanism, however, of the 19 species in the *Audibertia* subgenus, only one taxon (*Salvia columbariae*) has this trait. The

research objective is to elucidate the mutual adaptations between flowers and pollinators and to understand the evolutionary significance of the staminal lever mechanism.

- Project Title:** Western Renewable Energy Project
Researcher(s): Lauren Anderson and Brent Steel
Affiliation(s): Oregon State University
Funding: unknown
Description: Master's thesis. This research focuses on renewable energy siting issues in four western states: Washington, Oregon, Idaho, and California. Lauren is particularly interested in wind energy facilities and is using Riverside County as a case study in her research.
- Project Title:** *Salvia apiana* - a carpenter bee blossom? Pollination ecological studies in southern California
Researcher(s): Philipp Hühn and Regine Classen-Bockhoff
Affiliation(s): University of Mainz (Germany)
Funding: Deutsche Forschungsfoerdernde Gesellschaft
Description: Diploma thesis. Philipp is studying pollinator-driven evolution of floral traits in *Salvia apiana*. This research is a component of the research being conducted by Daniela Klein and Regine Classen-Bockhoff, discussed above.
- Project Title:** Basal plant facilitation extends to insect community structure and diversity in the Mojave Desert, California
Researcher(s): Ally Ruttan, Alex Filazzola, and Chris Lortie
Affiliation(s): York University
Funding: none
Description: Senior thesis. The focus for this project was to test the hypothesis that nurse-plant effects are not limited to other plants, but rather these effects can extend to other trophic levels such as the insect community. The results of their study, conducted at the Kelso Dunes on the sand hummocks dominated by creosote bush (*Larrea tridentata*), support a positive relationship between nurse-plant microsites and insect abundance, richness, evenness, diversity, and composition. In addition, they found certain insect families (Sphecidae, Formicidae, Bradynobaenidae, and Lauxaniidae) to be more closely associated with the shrub islands (nurse-plants), versus Scarabaeidae was associated with open sites.
- Project Title:** A desert nurse plant (*Larrea tridentata*) facilitates the germination and seed characteristics of winter annuals in California
Researcher(s): Amanda Liczner, Alex Filazzola, and Chris Lortie
Affiliation(s): York University
Funding: none
Description: Senior thesis. This project focused on plant-plant interactions in relationship to nurse-plant effects at the Kelso Dunes. In her thesis, she presents data supporting the hypothesis that (*L. tridentata*) nurse-plant effects on seed mass, viability, and germination rates are species specific. Only two of the four (*Chaenactis fremontii* and *Malacothrix glabrata*, but not *Aliciella leptomeria* and *Eriophyllum wallacei*) annual species tested in her reciprocal germination microclimate growth chamber experiment showed significant differences in seed biology. Further, the results from her study do not support the hypothesis that nurse-plants are influencing local adaptation, but rather influencing adaptative germination.

- Project Title:** Escape Tactics of Lizards In response to Perceived Predator Threat
Researcher(s): Ben Kligman
Affiliation(s): UC Berkeley
Funding: none
Description: Senior Thesis. Ben chose to study escape tactics of lizards in the desert for his final project, which led him to a variety of locations within the Mojave National Preserve. He collected data on nine species of lizards in five different habitats, including sand dunes and lava fields, for a total of 174 individual observations. Though the observational nature of his research doesn't allow for conclusive evidence about escape tactics, his observations corroborated many of the documented ecological principles already established, such as faster lizards are often found further from places of safety (from predators).
- Project Title:** Flora of San Bernardino County Desert Region
Researcher(s): James André
Affiliation(s): UC NRS Sweeney Granite Mountains Desert Research Center
Funding: none
Description: Career Research. This is a floristic effort for the desert regions of the largest county in the contiguous US, over 95% of which will be included in the boundary of this Flora. At 20,060 sq. mi., San Bernardino County encompasses more than 35 Wilderness areas, a multitude of habitats, and an incredibly rich vascular flora. André's book, to be published by F.M. Roberts Publications, will provide an annotated list of all species known to occur in the county, as well as floristic analyses, habitat descriptions, rare plant profiles, and selected color photographs.