



## **RESEARCH STATEMENT**

Foundationally, I am an evolutionary ecologist who applies his research to integrate behavioral ecology, community ecology, and conservation biology predominantly for applied outcomes and human-centric problem solving. My work focuses on how competition, predation risk, and environmental context influence species interactions, community structure, and the strategic decision-making of vertebrate species. Much of my research has taken place in arid and semi-arid environments, where resource scarcity and extreme climatic conditions amplify ecological trade-offs. I seek to understand how animals acquire, interpret, and respond to information about risk and resources—knowledge that can guide conservation strategies in fragile landscapes like the Great Basin, Mojave, and Sonoran Deserts.

My graduate training, conducted jointly at Ben Gurion University of the Negev and the University of Illinois at Chicago, centered on manipulative field experiments in desert rodent and reptile communities. These studies examined how predator lethality and constraint-breaking adaptations influence behavioral interactions, and whether such traits confer competitive advantages that may drive community shifts or biological invasions. Using the *landscape of fear* (LOF) framework, I demonstrated that ecologically convergent species can differ markedly in how they assess and respond to risk. These differences often reflect evolutionary histories—"ghosts of predators past"—and have important implications for predicting species resilience in changing environments.

This focus on decision-making under risk led to collaborations in diverse dryland ecosystems. In Australia's Simpson Desert, I worked with Prof. Chris Dickman to assess how shelter augmentation in post-fire landscapes influenced foraging dynamics and survival of small marsupials. In the Southwestern United States, I investigated predator-prey interactions and habitat use in desert-adapted granivorous rodents communities. These projects have combined significant field based behavioral observations, experimental manipulations in semi-natural arenas, and spatial analysis to reveal how physical structure, resource distribution, and predator guild and community composition shape wildlife behavior and ideal free distribution.

My current research continues to integrate the LOF framework with applied conservation in arid systems. In semi-natural and field settings, I investigate how variations in environmental cues, predator presence, and resource availability influence space use and risk perception. Future directions include:

1. **Eco-neurological underpinnings of risk assessment** – Building on work in Finland with bank voles, I plan to experimentally test how order and type of stressors influence risk perception and decision-making, and whether the same neural pathways underlie both ecological responses and pathological fear states. This line of research can help identify traits that make species vulnerable to novel predators or rapid environmental change.
2. **Predator management and community consequences** – In collaboration with colleagues in South Africa and New Zealand, I am examining how apex predator removal or exclusion affects prey behavior, trophic cascades, and community dynamics.

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These studies use fenced reserves and predator-free zones to quantify behavioral and demographic shifts across trophic levels. While the specific biodiversity of reclaimed mines in South Africa and the isolated-vulnerable biodiversity of New Zealand are unique, approaches that study human induced landscape level manipulations could be adapted to the heavy ranching activity landscapes surrounding Deep Springs.

3. **Dryland behavioral ecology and resilience** – Expanding my graduate work, I aim to study how seasonal variation, climate extremes, and vegetation change affect risk-sensitive foraging in small mammals and other desert fauna. This research is well suited for undergraduate participation, with various skill learning being incorporated as a fundamental aspect of the research. students engaging.
4. **Anthropogenic ecology and adaptation** – Drawing from my research in human-dominated landscapes, I am increasingly focused on the evolutionary underpinnings of adaptation to human activity and disturbance. This work examines how invasive species and rapidly expanding wildlife populations exploit anthropogenic infrastructure, altered predator regimes, and novel food sources, and how these changes cascade through ecological communities. This perspective adds an applied dimension to behavioral ecology, linking evolutionary processes to real-world management challenges.

Undergraduate involvement is integral to all aspects of my research. My students—many of whom are women and underrepresented minorities—have participated in every stage of the scientific process, from field experiments to peer-reviewed publication. My research philosophy is inherently place-based: I believe in adapting my background and expertise to the biodiversity, environmental context, and resources available wherever I teach and conduct research. This has meant working on tropical anoles in New Orleans despite my training as an arid zone ecologist and mammalogist, and using those experiences to push students to find scientific curiosity beyond taxonomic or ecosystem boundaries. Over the course of my career, I have expanded from my roots in mammalogy and ornithology—studying river otters and bird banding in temperate systems—to desert rodent behavioral ecology, mountain lion conservation in California, and marsupial foraging dynamics in Australia's Simpson Desert. Each shift has been driven by the environments where I have worked and the questions those landscapes naturally suggest. I believe that the questions about the structure and function of our environment are infinite; we only need to ask them.

### **Grants and Fellowships**

Beyond the abovementioned grants submitted in 2023, I successfully obtained postdoctoral fellowships and research grants as the R&D Manager at the Felidae Conservation Fund. In the latter role, I co-wrote over 70 proposals and fundraised more than \$400K in one year. Presently, I am a co-PI on two grants aimed at providing mentorship to undergraduate research students (BUILD and NIH URISE), as well as an NSF RaMP grant aiming to provide research experience to minority students interested in graduate education in conservation which is destined to be housed at the Audubon Nature Institute.