

2016 ANNUAL REPORT

UCLA La Kretz Center for California Conservation Science

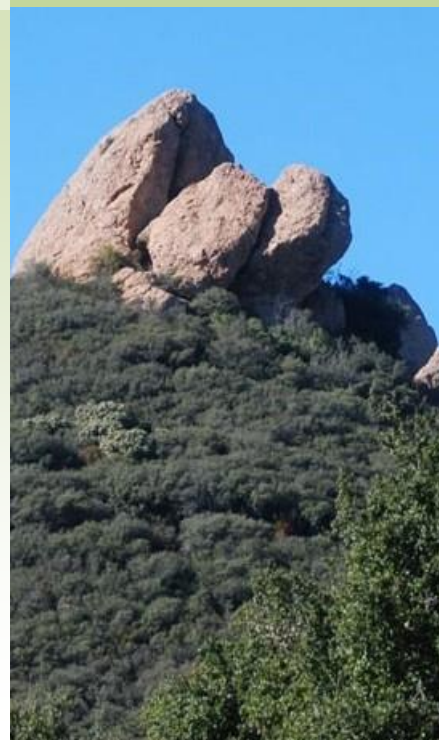
The year in review

Here at the La Kretz Center, our goal is to bring together the incredible academic community of UCLA conservation scientists and our equally amazing off-campus partners to do cutting edge research that enables positive conservation outcomes. 2016 was a great year for us. Our senior La Kretz postdoctoral researcher John Benson worked with colleagues in the National Park Service to provide unambiguous evidence that we need a wildlife corridor if our Santa Monica mountain lions are going to survive into this century; John will continue his work as a professor in the University of Nebraska's renowned wildlife department. Meanwhile, our current postdocs are working on projects as diverse as drought impacts on native plant communities, the importance of soil microbes in the regeneration of chaparral plants, and genomic analyses documenting how endangered newts and frogs make a living in Santa Monica Mountain streams. By combining forces with the UCLA Stunt Ranch Reserve we funded 13 graduate student scholars on diverse projects ranging from the secret lives of urban L.A. wildlife to the success of our Marine Protected Areas. We hosted public lectures and discussions highlighting how nature makes you smarter, and why biodiversity in the L.A. River is so important, and we brought our message to hundreds of school kids across Los Angeles.

It takes teamwork to turn great ideas into great action, and our La Kretz team continued to grow and flourish in 2016. We highlight some of our accomplishments for the year in this report.

Brad Shaffer, Director

*The La Kretz Center is made possible by a generous endowment from UCLA alumnus and philanthropist **Morton La Kretz**.*



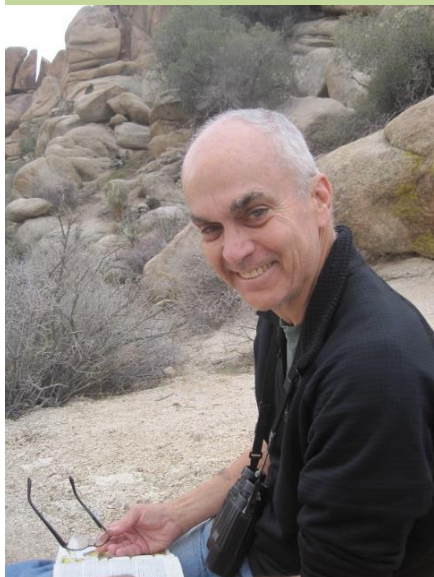
Contents

Director's Initiatives	2
Research Projects	3
Fellowships & Grants	4
Field Station	5
Stunt Ranch Reserve	6
Events & Workshops	7
Public Outreach	8
Publications	9
Board of Advisors	10
Partners	10
Contact Us	10

Our Mission

To conserve California's biodiversity and ecosystems through research, education and public programs.

Director's Initiatives



California Conservation Genomics Initiative

Genomics is a powerful tool for conservation. When properly done, genomics informs those tasked with protecting endangered species, helping identify the critical genes that enable species to survive alongside our growing human population. This year, in partnership with the UCLA Grand Challenges, the La Kretz Center launched our California Conservation Genomics Initiative to bring together academic scientists, resource managers and regulatory experts to exploit the power of cutting edge genomics in conserving

California's most threatened species.

In February, we hosted a two-day interdisciplinary workshop to identify 200 species that would benefit from this data-intensive approach. Follow-up work with federal and state agency collaborators and academic scientists from UC developed a plan to conduct fieldwork, collect DNA samples, perform genomic sequencing, and use environmental forecasting to determine how well (or poorly) threatened species are doing in California, now and as the climate changes in the coming decades.

"This initiative will transform wildlife management, helping agencies to build resilience into the protection of our most vulnerable species, habitats and ecosystems." —Brad Shaffer, Director

California Amphibian and Reptile Species of Special Concern

Co-authored by La Kretz Center Director Brad Shaffer, *California Amphibian and Reptile Species of Special Concern*¹² is a collaborative effort between the California Department of Fish & Wildlife and the Amphibian and Reptile Species of Special Concern Technical Advisory Committee, with stakeholder input from governmental agencies, universities, nongovernmental organizations, and private citizens drawn from across California.

Providing an up-to-date synthesis of the natural history and conservation risks faced by 45 of California's most sensitive amphibian and reptile species, this book is written in nontechnical language for a broad audience.

Available now from the [University of California Press](#).

Landscape genomic analyses of endangered California species launches

The La Kretz California Conservation Genomics Initiative opened its species portfolio with a new grant from the U.S. Fish & Wildlife Service (USFWS).

Director Brad Shaffer is the recipient of a new \$235,000 USFWS grant to conduct landscape genomic analyses of four California reptile and amphibian species that are candidates for listing under the US Endangered Species Act. The project entails a range-wide analysis of each species using tens of thousands of genes and hundreds of field-collected tissue samples to help the USFWS determine whether and at what level each species should be provided legal protection under the Act. Two UCLA graduate students and one postdoctoral researcher jointly working with Brad and Auburn University professor Jamie Oaks will conduct the research, providing training opportunities for these young scholars working at the interface of applied and basic research.

These species are a great start. However, our goal is to build on this initial work to bring additional funding and conservation genomics research to critically endangered species. We are in active negotiations to work on Giant Garter Snakes in California's San Joaquin and Sacramento Valleys, Western Pond Turtles from across Washington, Oregon, California, and northern Baja California, and California Tiger Salamanders in Santa Barbara. We're also exploring similar work on threatened and endangered insects, particularly California butterflies. Add to that ongoing work on Yellow-legged Frogs and Western Spadefoot Toads (both candidates for federal listing) and listed Desert Tortoise and Tiger Salamander populations, and we are well on our way in 2016.

Finally, we are also working closely with the newly funded [UC Conservation Genomics Consortium](#). Overall, our vision of using genomics to manage endangered California species moved a giant step forward in 2016.



Environmental change in the chaparral shrublands of the Santa Monica Mountains

La Kretz postdoc Alex Pivovarov is studying how our local chaparral shrublands respond to environmental change through multiple ongoing projects. In collaboration with the National Park Service and USGS, she is linking plant eco-physiological traits with live fuel moisture, which is a critical fire risk trait. Her research shows that leaf characteristics and plant rooting depth are two critical traits related to live fuel moisture. In addition, she is working with Dr. Ulli Seibt (UCLA Department of Atmospheric and Oceanic Sciences) to monitor plants at Stunt Ranch during heat waves. Their research indicates that our shrubs recover remarkably well from occasional heat waves, but hotter, longer, or more frequent heat waves may put these plants at increased risk. Future work will wire up Stunt Ranch with Arable PulsePod sensors to quantify the stress and responses of more species, uploading the data online so that it is available for other researchers.

Conservation management plan for amphibians of the Santa Monica Mountains

La Kretz postdoc Gary Bucciarelli uses field ecology and genomics to determine how stream-breeding amphibians live in the fragmented Santa Monica Mountains landscape, identifying populations of conservation concern.

Using next-generation sequencing techniques to study thousands of genes from three amphibian species, Gary is assessing genetic diversity, connectivity, and individual movement between breeding streams. These data will help identify habitat and populations of high conservation priority to the National Park Service.

Over the past five years, Gary has also studied the chemical ecology of our local newts, which possess a neurotoxin that evolved as a chemical defense against predators. In a recent publication³, he looks at how our newts produce and maintain the toxin, and why it varies so much in populations and individuals over time.

Research

Experimental Restoration of Native Grassland

La Kretz Postdoc Justin Valliere and UCLA researcher Emily Curd are collaborating with Stunt Ranch Reserve to restore native California grassland.

Prior to land clearing, the restoration site was dominated by invasive Eurasian grasses. These species can actually modify soil environments and microbial communities to the detriment of native species. To mitigate the long-term influence of Eurasian grasses on soil communities and native grassland restoration efforts, Justin and Emily will inoculate some of the restoration soils with those collected from underneath native grassland plants growing nearby. The hypothesis is that native plants will grow faster with the aid of native soil microbial communities.

The information gained from this study will help to inform future restoration strategies and improve restoration outcomes in southern California.





Meet our new postdocs

Justin Valliere is a plant ecologist studying how multiple drivers of global environmental change such as drought, air pollution, and invasive plant species interact to impact native plant communities of southern California. Justin earned his Ph.D. in Plant Biology from UC Riverside and joined us in October.

Jesse Grismer is collaborating on our U.S Fish & Wildlife Service grant to determine whether two species of California amphibians and reptiles are genetically distinct populations that require listing as endangered species. A visiting postdoc from Auburn University, Jesse earned his Ph.D. in Ecology and Evolutionary Biology from the University of Kansas and joined the La Kretz team in November.

... and say goodbye to an outgoing postdoc

As a La Kretz postdoc, **John Benson** worked with the National Park Service to model the population dynamics of our small mountain lion population isolated by freeways and habitat fragmentation in the Santa Monica Mountains.

John is now an Assistant Professor of Vertebrate Ecology with the School of Natural Resources at the University of Nebraska. His research program will involve tackling applied and basic questions in ecology – mostly with populations of carnivores and ungulates across North America and around the world.

During his tenure at the La Kretz Center, John published two scientific papers^{1, 2} on his mountain lion work, which was also the subject of numerous articles in the popular press.

Fellowships

Conservation research grants awarded to UCLA students and postdocs

In collaboration with the Stunt Ranch Reserve, the La Kretz small grant program funds student and postdoc research that addresses important issues in basic environmental sciences and simultaneously fulfills our mission of working to preserve California's biological and ecosystem diversity.

Congratulations to:

Kelly Barr: Conservation and management of the tricolored blackbird

Robert Cooper: Attenuating the spread of invasive tiger salamander genes

Evelin Escobedo: Role of plant maternal effects in response to drought at Stunt Ranch Reserve

Jesse George: Using plant remains from the La Brea Tar Pits to assess the impact of climate change

Zack Gold: Rapid environmental DNA assessments of marine biodiversity

Brigit Harvey: Seed preference in the endangered Pacific pocket mouse

Sarah Helman: Cryptic contributors in a complex multi-host disease system, *and* Zoonotic pathogen screening of wild mammals (2 separate grants)

Camila Medeiros: Conservation physiology of Californian flora at Stunt Ranch Reserve

Alexandria Pivovarovff: Deploying sensors to continuously and remotely monitor plant stress at Stunt Ranch Reserve

Bree Putman: Does fear eliminate lizards from urban areas in L.A.?

Erin Toffelmier: Reptile diversity and landscape genetic connectivity in L.A.

Jacqueline Zhang: Global-change-type drought effects on native California plant species

Field Station



Field station usage continues to grow

Field station usage continued to increase in 2016. Well over 100 students, faculty, research scientists, and resource managers used the facilities on 867 days and 675 nights, making this our busiest year yet.

Three university research teams booked in for multi-day stays, with projects ranging from studies of birdsong in the wild to the ecology and evolution of plant defenses against native herbivores.

We hosted four overnight retreats by groups from UC and CSU, two workshops on conservation genomics and climate change, and one professional development meeting for the National Park Service trails management team.

In addition, special housing was provided to tribal community members for a Native American remains reburial at Stunt Ranch Reserve. La Kretz postdoc John Benson and Mountains Restoration Trust ecologist Sara Gabel were full time residents for almost 6 months each.

“The La Kretz Field Station provides the perfect venue for field research, workshops, meetings, and environmental brainstorming in the mountains.” —Peter Kareiva, IoES Director

Restoration ecologist in residence at field station

Sara Gabel works in the aquatics division of Mountains Restoration Trust (MRT) as a Restoration Ecologist/Field Specialist, removing invasive red swamp crayfish from the Malibu Creek water shed. She bases her work for the MRT from the La Kretz Field Station, where she has been a full time resident since July.

This past year, Sara also interned with the National Park Service Santa Monica Mountains National Recreation Area doing interpretation and community outreach through their volunteer program.

A graduate of the University of Maryland, College Park with a BS in Wildlife Ecology and Management and a minor in Geographic Information Systems, Sara “loves exploring the mountains on hikes, swimming and tide pooling, and just being outside!”

New lab at the La Kretz Field Station

Thanks to a generous grant from former Supervisor Zev Yaroslavsky and the L.A. County Board of Supervisors, the field station will undergo a major expansion in 2017. After a year of planning, architectural drawings for a new 1300 square foot building are almost complete. The new facility will provide lab space and overnight accommodations for field researchers, and a self-contained necropsy lab for National Park Service wildlife ecology studies. With design input from UCLA architects, the new lab (see the conceptual drawing below) will be a multi-use facility serving our diverse community of conservation researchers in the L.A. region.



Stunt Ranch Reserve



Joint venture by Stunt Ranch and La Kretz to advance California conservation science

When Brad Shaffer took over as director of both Stunt Ranch Reserve and the La Kretz Center, we embarked on a unique mission to combine the scientific and educational goals of the UC Natural Reserve System and La Kretz under a single, conservation science umbrella. Stunt has land, the La Kretz field station has housing, and each has a research budget. Put them together, and we have been able to increase our support of graduate student and postdoctoral

research, develop new conservation projects with our Santa Monica Mountains partners, and continue the extraordinary K-12 outreach program at Stunt developed and run by the Cold Creek docents. We encourage students of all disciplines – natural history, sociology, fine arts, and education – to visit Stunt Ranch, launch research projects, brainstorm conservation initiatives, or just clear their heads and let nature help them think.

“Stunt Ranch Reserve and the La Kretz Center are not just partners, but joint endeavors that will increase the separate impacts of each.” —Victoria Sork, UCLA Dean of Life Sciences

Native American reburial

The La Kretz Center, Stunt Ranch Reserve, UCLA campus administration, and local Native American tribal leaders worked over the last 3 years to rebury over 2,000 ancestors and cultural artifacts that were previously held in collections. The reburial allowed the local tribal communities to provide a proper burial ceremony for their ancestors, and dozens of tribal members and UCLA faculty and staff collaborated to help accomplish this significant undertaking.

Stunt Ranch was an ideal location for the reburial because the property is protected by the UC in perpetuity. The selected site for the reburial was chosen by the tribal communities and approved by the UC.

During the process of preparing the one acre reburial site, contractors cleared two large areas of all non-native plants, providing an opportunity to initiate a native grassland restoration project at Stunt Ranch (story on page 3).

Q&A with Gary Bucciarelli, Research Director

1. What is your proudest accomplishment at Stunt in your first year?

The collaborative relationships Stunt has formed with the La Kretz Center and all of our partner agencies, including the National Park Service, Mountains Restoration Trust, California Department of Fish and Wildlife, and California State Parks. These relationships are generating awesome research programs and data that the agencies can use to really inform their decisions about managing land.

2. ... and your biggest challenge?

My biggest challenge right now is building a strong core research program at Stunt. I think things are moving in the right direction. There is more research happening at Stunt, from undergraduates to emeritus faculty, which is great. We need more researchers in the greater Los Angeles area to recognize that Stunt Ranch is a viable, local resource for their research programs.

3. What will make 2017 a great year for your program at Stunt?

All this rain! We haven't had this much rain in a few years. It will be a boon to plants, animals, and researchers. Our long-term research teams will be able to evaluate plant physiology in a way they haven't been able to for years. And, I suspect it will result in a lot of animal activity, which has been relatively minimal throughout the drought.

4. Tell us one cool fact about Stunt.

You can now spend the night at Stunt.

To learn more about Stunt Ranch Reserve, please visit our new website at <http://stuntranch.ucnrs.org/>

Events



Rethinking the Value of Nature from Education to Health

The [7th Annual La Kretz Public Lecture](#) was presented by Dr. Heather Tallis, Global Managing Director and Lead Scientist for Strategy Innovation for The Nature Conservancy.

In her lecture, Dr. Tallis discussed the impact of natural landscapes on human well-being. From student test scores to physical ailments, Dr. Tallis' research indicates that nature plays a bigger part in daily life than you might expect.

In the panel discussion following the lecture, L.A. elementary school principal Brad Rumble inspired our audience with his story about the native plant habitat on his campus. *The plants attracted insects, which attracted birds, which attracted students, who, fascinated by the nature unfolding before them, learned so much that their test scores in science rose six fold. (LA Times)*

The La Kretz Center brings to Los Angeles renowned thinkers, researchers and leaders to educate and inspire our audience—and ourselves—on conservation science.



Our National Parks at 100

Dr. Ray Sauvajot will present the 8th Annual La Kretz Public Lecture, "Our National Parks at 100: Confronting Change and Committing to Science."

As Director of Natural Resource Stewardship and Science at the National Park Service, Dr. Sauvajot leads a team of 720 scientists, technicians, and managers who expand scientific knowledge of the air, water, biological, physical, and geological resources that the National Park Service is responsible for preserving and protecting across the United States.

Save the date. Ray's lecture will be on Sunday, April 23rd.

Life in the L.A. River

With the imminent revitalization of the L.A. River, the city's landscape is about to transform. But how will the restoration project impact life in and around the river? At our [2nd Annual Public Discussion](#), the La Kretz Center and the Natural History Museum of L.A. County brought to the stage a historian, ecologist, urban planner, and community leader to talk about this often overlooked waterway from a biological perspective.

Whatever the long-term outcome of the restoration project, La Kretz Center Director Brad Shaffer sees the river as a fascinating example of urban ecology, where species' adaptive resilience can be observed in the presence of dense human development.

Biodiversity in 2050 L.A.

LA is one of the great urban biodiversity hotspots on earth. At the [IoES Earth Now: Earth 2050 Symposium](#), Brad Shaffer discussed how Los Angeles can help prevent the extinction of species from around the world, while also making it an even more amazing place for people.

4th Annual Conservation Genomics Workshop

The 2016 La Kretz Conservation Genomics workshop drew 21 students from 12 states and 4 countries. Our team of instructors, including agency collaborators and university faculty, gave lectures, led hands-on computer exercises, and coached students on how to best analyze genomic data to inform conservation decision-makers.



Citizen Science Program

The La Kretz Center works with UCLA graduate students on citizen science projects, where members of the public are invited to collaborate with scientists doing on-the-ground research that protects and preserves local habitats and species. The graduate student projects vary from collecting ocean water samples for marine biodiversity assessments, to observing wildlife in highly urbanized environments. If you are interested in becoming a citizen scientist, please follow the links below.

[Message in a Bottle](#): Ever been walking along the shore and wondered who is living beneath the waves? With new rapid and reliable environmental DNA techniques all you need is a bottle of seawater and a high tech genomics lab. Here at UCLA we can do the DNA work, but we can't collect enough seawater samples by ourselves. You can help us sample your ocean backyard. If you are interested in joining the project or have any questions, please [contact Zack Gold](#).

[Urban ecology of backyard lizards](#): Against all odds, alligator lizards persist in urban and suburban Los Angeles when many other native species cannot. We are looking for volunteers to help us understand how these lizards succeed in one of the most highly urbanized environments in the world. No experience is necessary, just a willingness to learn. We will provide training in identification and observation. Interested in participating? [Fill out our survey](#).

K-12 Events

The La Kretz Center partnered with the UCLA Bruins Naturalist Club to bring local high school students to a BioBlitz, where teams of volunteer scientists worked with students to find and identify as many species of plants and animals as possible on the UCLA Stunt Ranch Reserve.

We also reached out to school children and their families with booths at the UCLA Explore Your Universe Festival, the L.A. Nature Urban Fest at the Natural History Museum, the Werner Elementary School Science Slam, and the National Park Service Science Festival.

Outreach

Lake Elizabeth pond turtle update

In 2015 we cared for 30 threatened Western Pond Turtles as persistent drought reduced their Lake Elizabeth habitat in eastern L.A. County to a dry, lethal saltpan.

After 8 months of rehabilitation at UCLA, the turtles were released into nearby Munz Lake in a joint effort with colleagues from the California Department of Fish and Wildlife.

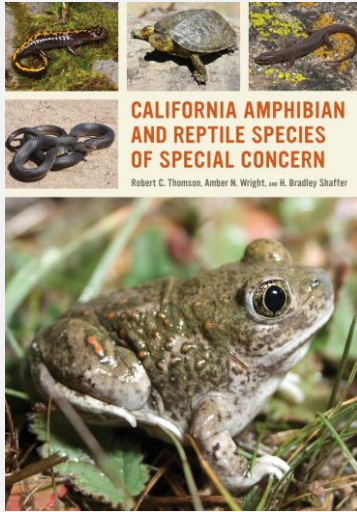


In June 2016, a year post-release, an overnight survey by Brad Shaffer and La Kretz Leaguer Ralph Perri revealed that most of the rescued turtles are healthy and growing.

"We were thrilled to learn that our recovery efforts were successful," Shaffer said. "Thanks for your help, Ralph."



Publications



Books and book chapters

12. Thomson, R. C., A. N. Wright, and H. B. Shaffer. 2016. California Amphibian and Reptile Species of Special Concern (University of California Press 390 + xv pages)
13. Shaffer, H. B. 2016. Evolution and Conservation pp. 220-237 in *How Evolution Shapes our Lives, Essays on Biology and Society*, J. B. Losos and R. E. Lenski, editors. Princeton University Press.

Journal Articles

1. Benson, J. F., Mahoney, P. J., Sikich, J. A., Serieys, L. E. K., Pollinger, J. P., Ernest, H. B., and S. P. D. Riley. 2016. Demographic, genetic, and landscape interactions threaten viability of a large carnivore in a major metropolitan area. *Proceedings of the Royal Society B* 283 (Cover Article)
2. Benson, J. F., Sikich, J. A., and S. P. D. Riley. 2016. Population and individual level resource selection patterns of mountain lions preying on mule deer along an urban-wildland gradient. *PLoS One* 11(7).
3. Bucciarelli G. M., Green D. B., Shaffer H. B., and L. B. Kats. 2016. Individual fluctuations in toxin levels affect breeding site fidelity in a chemically defended amphibian. *Proc. R. Soc. B* 283:20160468
4. McCartney-Melstad, E., Mount, G. G., and H. B. Shaffer. 2016. Exon capture optimization in amphibians with large genomes. *Molecular Ecology Resources* 16:1084-1094.
5. Pivovarovoff, A. L., Burlett, R., Lavigne, B., Cochard, H., Santiago, L. S., and S. Delzon. 2016. Testing the 'microbubble effect' using the Cavitron technique to measure xylem water extraction curves. *AoB Plants*, 8: plw011
6. Searcy, C. A. and H. B. Shaffer. 2016. Do ecological niche models accurately identify climatic determinants of species ranges? *American Naturalist* 187:423-435.
7. Searcy, C. A., H. B. Rollins, and H. B. Shaffer. 2016. Ecological equivalency as a tool for endangered species management. *Ecological Applications* 26:94-103.
8. Spinks, P. Q., Thomson, R. C., McCartney-Melstad, E., and H. B. Shaffer. 2016. Phylogeny and temporal diversification of the New World pond turtles (Emydidae). *Molecular Phylogenetics and Evolution* 103:85-97.
9. Wayne, R. K. and H. B. Shaffer*. 2016. Hybridization and endangered species protection in the molecular era. *Molecular Ecology* 25:280-289.
*Wayne/Shaffer co-first authors
10. Wielstra, B., Burke, T., Butlin, R. K., Schaap, O., Shaffer, H. B., Vrieling, K., and J. W. Arntzen. 2016. Efficient screening for 'genetic pollution' in an anthropogenic crested newt hybrid zone. *Conservation Genetics Resources* 8:553-560.
11. Wright, A. N., Schwartz, M. W., Hijmans, R. J., and H. B. Shaffer. 2016. Advances in climate models from CMIP3 to CMIP5 do not change predictions of future habitat suitability for California reptiles and amphibians. *Climatic Change* 134:579-591.

Contact Us

UCLA La Kretz Center for California Conservation Science

La Kretz Hall, Suite 300
Box 951496
Los Angeles, CA 90095-1496
(310) 825-5008 phone
(310) 825-9663 fax
lakretz@ioes.ucla.edu

Brad Shaffer, Professor and Director
Gary Bucciarelli, Stunt Ranch Research Director
Mario Colon, Administrative Assistant
Sid Shah, Project Coordinator

<https://www.ioes.ucla.edu/lakretz/>



*The La Kretz Center, a research unit of the
UCLA Institute of Environment and
Sustainability, is jointly administered by
UCLA College, Division of Life Sciences.*

Board of Advisors

Daniel Blumstein

Professor, UCLA Department of Ecology
and Evolutionary Biology

J.R. DeShazo

Professor and Director, UCLA
Department of Public Policy, Luskin
Center for Innovation

Paul Edelman

Chief of Natural Resources and
Planning for the Mountains Recreation
and Conservation Authority (MRCA),
and Deputy Director of the Santa
Monica Mountains Conservancy
(SMMC)

Madelyn Glickfeld

Director of Partnerships and Staff
Director UCLA Water Resources Group,
Institute of the Environment and
Sustainability

Peter Kareiva

Director, UCLA Institute of the
Environment and Sustainability

Danielle LeFer

Environmental Coordinator, CA Dept.
of Parks and Recreation – Angeles
District

Sophie Parker

Senior Scientist, The Nature
Conservancy

Philip W. Rundel

Distinguished Professor, UCLA
Department of Ecology and
Evolutionary Biology

Yongwei Sheng

Associate Professor, UCLA Department
of Geography

Victoria L. Sork

UCLA Life Sciences Division Dean and
Professor, Department of Ecology and
Evolutionary Biology

Jann Vendetti

Twila Bratcher Chair in Malacological
Research, Museum of Natural History
of L.A. County

Larry Wan

Mountains Recreation and
Conservation Authority

Jerald L. Weaver

Chief of Planning, Science and
Resource Management, Santa Monica
Mountains National Recreation Area
National Park Service

Our Partners

We are affiliated with a diverse network of UCLA faculty, postdocs and students, and we work closely with the U.S. National Park Service, the Museum of Natural History of Los Angeles County, the Orange County Natural Communities Coalition, The Nature Conservancy, the US Geological Survey, the US Fish and Wildlife Service, the California Department of Fish and Wildlife, and the US Bureau of Land Management to protect and restore California's biodiversity resources.