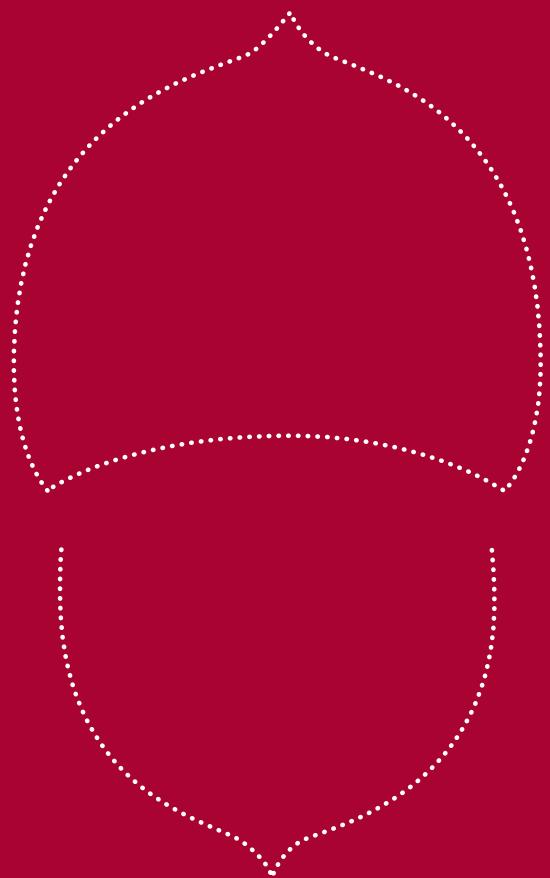


**Stanford** | Jasper Ridge  
Biological Preserve  
SCHOOL OF HUMANITIES & SCIENCES



# Annual Report 2017 - 2018

Jasper Ridge Biological Preserve

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# Directors' Report

This year has been a busy and exciting one at Jasper Ridge. Our usual high-quality research, education, outreach, and conservation activities have continued apace, but in addition a two-year effort to identify the needs of our community—including students, faculty, staff, alumni, docents, national and international field-station researchers and educators, Stanford upper administrators, and local residents—has resulted in a [strategic plan](#) to help guide us through the next decade. The planning process affirmed our long-standing mission and also crystallized a vision for Jasper Ridge and pledge to all those who use our remarkable facility.

**Our Mission**—To contribute to the understanding of the Earth's natural systems through research, education, and protection of the preserve's resources.

**Our Vision**—To be a leader for innovation in research, education, and communication on natural systems, through providing an interdisciplinary, cross-cultural, and place-based training ground for effective Earth stewardship by our community and the next generations of global leaders.

**Our Pledge**—To be a safe and welcoming place for discovery, discussion, and community for people of all cultures and identities.

The planning process has been valuable in crystallizing three initiatives that will provide more opportunities for discovery, learning, and communication through fostering interdisciplinary interactions, and in highlighting a path for attending to key infrastructure and other issues that the preserve will be facing over the next decade. We invite you to download a poster that highlights the main points of the strategic plan [here](#), and a more expanded version of the plan [here](#).

Among recommendations we've already taken to heart are initiating new kinds of research projects, hosting new classes, improving communication, and beginning work on updating infrastructure. We're thrilled to be working with you all to take Jasper Ridge into a future of continued discovery and service that will incubate solutions to environmental stewardship challenges at local, regional, and global scales.

## **ELIZABETH A. HADLY**

Faculty Director, HHMI Professor, and Paul S. and Billie Achilles Professor of Environmental Biology

## **ANTHONY D. BARNOSKY**

Executive Director and Professor of Biology

# Research

More than 75 researchers conducting 60 projects relied on Jasper Ridge as a living laboratory this year. Among them were several new researchers and/or projects we have been delighted to welcome.

**Dave Koweeck, Clara Garcia-Sanchez** (postdoctoral scholars) and professor **Ken Caldeira** (from the Carnegie Institution for Science and Stanford) used Jasper Ridge to prototype a device they invented to oxygenate water at depth, with the longer term goal of deployment in marine ecosystems to mitigate the development of “dead zones” caused by pollutants. On the ridgetop grassland, professor **Chris Field** installed a new “eddy flux” station that tracks land-atmosphere exchange of gases, and links with new surveys of vegetation health conducted via drones and new field sensors installed by **Joe Berry’s** lab (Carnegie Institution). A team from the **Hadly Lab**, including **Kevin Leempoel** (postdoctoral scholar), **Jordana Meyer** (PhD student), and **Kathryn Hoaglund** (undergraduate) have been using camera-traps and other noninvasive techniques like scat analysis, environmental DNA, and genomic techniques to unravel predator-prey dynamics and mammalian food webs of the past decade. **Maria Viteri** (PhD student) began extending the record of faunal changes even deeper into the past through identifying bones and other material from midden deposits, owl pellets, and archaeological sites. Also in the **Hadly Lab**, visiting professor **Jérôme Mathieu** (Sorbonne University, Paris) teamed up with **Sergio Redondo** (Stanford PhD student) to better understand the diversity of earthworms and their role in influencing soils, vegetation, and uptake of mercury in terrestrial environments, and **Kate Lagerstrom** began a study of the distribution of *E. coli* in wildlife. **David Tattoni’s** (undergraduate in the Earth Systems Program advised by **Rodolfo Dirzo**) bird-banding and mist-netting project is providing new information about why neotropical migrant birds have declined in Jasper Ridge’s wetlands as well as globally. David is also conducting a study about why slender salamanders have not exhibited any signs of being affected by chytrid fungus, which has devastated amphibian populations worldwide. **Rebecca Nelson’s** (undergraduate in the **Dirzo Lab**) study of oaks in California is paired with studies in Mexico to test whether herbivory and plant defenses against herbivores increase towards tropical regions, a long-standing hypothesis which has come under recent scrutiny. Within the **Fukami Lab**, undergraduate **Noam Rosenthal** conducted an independent study examining the nectar microbiome of the hummingbird-pollinated flowers of *Pedicularis densiflora*, and postdoctoral scholars **Leslie Decker** and **Megan Morris** joined the lab and started new studies of the floral microbiome of various species.

We also launched three new multi-year research initiatives this year, in accordance with our [strategic plan](#). The Anthropocene Biodiversity initiative led by **Liz Hadly** and **Tony Barnosky** focuses on understanding how the Jasper Ridge ecosystem will respond to the rapid human-driven global changes now underway. One part involves establishing the century-to-millennial scale ecological baseline needed to effectively guide nature into the future; towards this goal we began collaborating with scientists at the United States Geological Survey to obtain the requisite paleoecological proxy data. The Science for Land Stewardship initiative is intended to help generate the knowledge needed to effectively manage the San Francisco Bay area's regional ecosystems into the future. With this in mind, a new project with the Santa Cruz Mountains Stewardship Network started up, spearheaded by **Kelly McManus Chauvin** (postdoctoral scholar). Kelly's work will enable answering questions about socioecological processes at the landscape scale in the Santa Cruz Mountains region, including in and around Jasper Ridge. The Out of the Box and Into the Cloud initiative, which **Simon Morgan** is helping to implement, capitalizes on Jasper Ridge's cutting-edge field technology and our proximity to Silicon Valley to advance off-grid field instrumentation and on-site analyses exportable to field stations around the world. The goal is to provide opportunities for students and faculty to collaborate locally, regionally, and internationally to address global-scale questions that previously were not feasible to study. This year the work was informed by a series of workshops that included researchers from biological field stations, universities, NGOs, nature reserves, and tech companies based in the United States, China, India, Nepal, Mongolia, Mexico, Peru, Botswana, Tanzania, and Madagascar that crystallized the most productive paths forward, and by field-testing off-grid instrumentation both at Jasper Ridge and in the Okavango Delta in Botswana. First steps on the three new initiatives have been supported by a reallocation of some reserve funds, by a new grant from the Bechtel Foundation, and by a planning grant from the National Science Foundation.

Volunteers continue to make important contributions to research at Jasper Ridge, with this year seeing the creation of a new resource, the [Birds of Jasper Ridge Photo Gallery](#) by **Peter and Diane Hart**, which provides photographic records of the birds found in the preserve. This effort complements other important photographic and archival resources that would not exist without volunteer efforts: the [Oakmead Herbarium and Collections](#), the [Bird Monitoring Program](#), and a library of camera-trap photos that is providing information vital to ongoing studies.

# Publications

## 2017-18 Publications that incorporate JRBPs data, samples, or field sites, or address JRBPs education programs or management issues

1. Akob DM, et al. (2018) Acetylenotrophy: a hidden but ubiquitous microbial metabolism? *FEMS Microbiology Ecology* 94(8):fify103-fify103.
2. Chay F, Black H, & Nevle R (2018) Quick capture and questions: A curriculum for introducing natural history through field journaling. *Journal of Natural History Education and Experience* 12:5-14.
3. Dittmar EL (2017) *Local Adaptation and Fitness Trade-Offs*. Doctoral dissertation, Michigan State University.
4. Fenn ME, et al. (2018) On-road emissions of ammonia: An underappreciated source of atmospheric nitrogen deposition. *Science of The Total Environment* 625:909-919.
5. Foxcroft LC, Pyšek P, Richardson DM, Genovesi P, & MacFadyen S (2017) Plant invasion science in protected areas: progress and priorities. *Biological Invasions* 19(5):1353-1378.
6. Fukami T (2018) Messy Communities: The Arising Researcher. *The Bulletin of the Ecological Society of America* 99(1):58-59.
7. Ghrehaghaji M, Minor ES, Ashley MV, Abraham ST, & Koenig WD (2017) Effects of landscape features on gene flow of valley oaks (*Quercus lobata*). *Plant Ecology* 218(4):487-499.
8. Ingersoll R & Lentink D (2018) How the hummingbird wingbeat is tuned for efficient hovering. *The Journal of Experimental Biology* 221(20).
9. Klimley AP, Wyman MT, & Kavet R (2017) Chinook salmon and green sturgeon migrate through San Francisco Estuary despite large distortions in the local magnetic field produced by bridges. *PLOS ONE* 12(6):e0169031.
10. Ko M-S, Lee S, & Kim K-W (2018) Reductive dissolution and sequestration of arsenic by microbial iron and thiosulfate reduction. *Environmental Geochemistry and Health*, pp. 1-7.
11. Koenig WD, Knops JMH, Carmen WJ, & Pesendorfer MB (2017) Testing the terminal investment hypothesis in California oaks. *The American Naturalist* 189(5):564-569.
12. Koenig WD, Knops JMH, Carmen WJ, Pesendorfer MB, & Dickinson JL (2018) Effects of mistletoe (*Phoradendron villosum*) on California oaks. *Biology Letters* 14(6).
13. Letten AD, Dhami MK, Ke P-J, & Fukami T (2018) Species coexistence through simultaneous fluctuation-dependent mechanisms. *Proceedings of the National Academy of Sciences*, p. 201801846.
14. Lindsey NJ, et al. (2017) Fiber-Optic Network Observations of Earthquake Wavefields. *Geophysical Research Letters* 44(23):11,792-799.
15. Martin ER, et al. (2017) Seismic monitoring leveraging existing telecom infrastructure at the SDASA: Active, passive, and ambient-noise analysis. *The Leading Edge* 36(12):1025-1031.
16. Mellett T, et al. (2018) Assessing Cumulative Effects of Climate Change Manipulations on Phosphorus Limitation in a Californian Grassland. *Environmental Science & Technology* 52(1):98-106.
17. Mukundarajan H, Hol FJH, Castillo EA, Newby C, & Prakash M (2017) Using mobile phones as acoustic sensors for high-throughput mosquito surveillance. *elife*, 6, e27854
18. Paz-Kagan T & Asner GP (2017) Drivers of woody canopy water content responses to drought in a Mediterranean-type ecosystem. *Ecological Applications* 27(7):2220-2233.
19. Perea R, López-Sánchez A, & Dirzo R (2017) Differential tree recruitment in California oak savannas: Are evergreen oaks replacing deciduous oaks? *Forest Ecology and Management* 399(Supplement C):1-8.

20. Porter SS, Faber-Hammond J, Montoya AP, Friesen ML, & Sackos C (2018) Dynamic genomic architecture of mutualistic cooperation in a wild population of *Mesorhizobium*. *The ISME Journal*.
21. Romero-Olivares AL, Allison SD, & Treseder KK (2017) Soil microbes and their response to experimental warming over time: A meta-analysis of field studies. *Soil Biology and Biochemistry* 107:32-40.
22. Sanders MJ (2018) Can Relinquishing Control Restore Our Urban Waterways? *Natural Resources & Environment* 32(3):3-7.
23. Siebecker MG, Chaney RL, & Sparks DL (2017) Nickel speciation in several serpentine (ultramafic) topsoils via bulk synchrotron-based techniques. *Geoderma* 298:35-45.
24. Skowronek S, Asner GP, & Feilhauer H (2017) Performance of one-class classifiers for invasive species mapping using airborne imaging spectroscopy. *Ecological Informatics* 37:66-76.
25. Spear ER & Mordecai EA (2018) Foliar pathogens are unlikely to stabilize coexistence of competing species in a California grassland. *Ecology* 99(10):2250-2259.
26. Sproul AS (2017) Evaluating small dam removal planning in the San Francisco Bay Area. Master's Thesis, San Francisco State University.
27. Strong AL, Johnson TP, Chiariello NR, & Field CB (2017) Experimental fire increases soil carbon dioxide efflux in a grassland long-term multifactor global change experiment. *Global Change Biology* 23(5):1975-1987.
28. Tangaa SR, Selck H, Winther-Nielsen M, & Croteau M-N (2018) A biodynamic understanding of dietborne and waterborne Ag uptake from Ag NPs in the sediment-dwelling oligochaete, *Tubifex tubifex*. *NanoImpact* 11:33-41.
29. Vannette RL & Fukami T (2017) Dispersal enhances beta diversity in nectar microbes. *Ecology Letters* 20(7): 901-910.
30. Vannette RL & Fukami T (2018) Contrasting effects of yeasts and bacteria on floral nectar traits. *Annals of Botany* 121(7):1343-1349.
31. Wang C, et al. (2018) Cross-validation of independent ultra-low-frequency magnetic recording systems for active fault studies. *Earth, Planets and Space* 70(1):57.

## **2017-18 Publications by JRBP staff relating to the mission and initiatives of the preserve**

32. Barnosky AD, et al. (2017) Merging paleobiology with conservation biology to guide the future of terrestrial ecosystems. *Science* 355(6325).
33. Dexin T, Yan X, Barnosky AD, & Fuwen W (2018) Defining the balance point between conservation and development. *Conservation Biology*, pp. 1-8, DOI: 10.1111/cobi.13221.
34. Hill AP & Hadly EA (2018) Rethinking “Native” in the Anthropocene. *Frontiers in Earth Science* 6:96.
35. Steffen W, et al. (2018) Trajectories of the Earth System in the Anthropocene. *Proceedings of the National Academy of Sciences* 115(33):8252-8259.
36. Waters CN, et al. (2018) Global Boundary Stratotype Section and Point (GSSP) for the Anthropocene Series: Where and how to look for potential candidates. *Earth-Science Reviews* 178:379-429.
37. Williams M, et al. (2018) The palaeontological record of the Anthropocene. *Geology Today* 34(5):188-193.
38. Zalasiewicz J, et al. (2017) Making the case for a formal Anthropocene Epoch: an analysis of ongoing critiques. *Newsletters on Stratigraphy* 50(2):205-226.
39. Zalasiewicz J, et al. (2017) Scale and diversity of the physical technosphere: A geological perspective. *The Anthropocene Review* 4(1):9-22.

# Education and Outreach

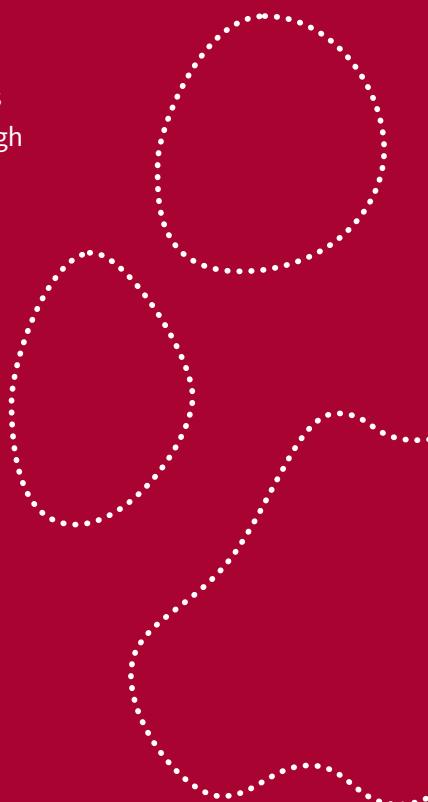
The education programs of Jasper Ridge saw approximately 9,000 visits by participants this year. Much of the increase in numbers is attributable to the first [open house](#) we held in over a decade: an estimated 2,500 people visited over the course of a day, learning through exhibits, talks, and self-guided hikes about what goes on at Jasper Ridge and how we accomplish our mission. Excluding the open house, educational use of the preserve included at least 6,556 visits, more than last year.

At least 2,351 of the visits were by Stanford students who took regularly-offered, field-based courses taught on-site (BIO/EARTHSYS 105 and BIO 47) or took field trips to Jasper Ridge as part of the coursework in a wide variety of Stanford classes. Classes taught at Jasper Ridge continued to inspire students, as was nicely documented in a [podcast](#) produced by BIO/EARTHSYS 105 student **Gabriela Nagle-Alverio**.

We increased the on-site teaching portfolio through hosting two new courses that used art as an entry point for understanding and exploring natural systems: EARTHSYS 24 (taught by **Hannah Black**) and ARTSTUDI 184 (taught by visiting artist **Catherine Chalmers**). These classes were part of a broader effort to engage scholars in the arts and humanities at Jasper Ridge. Also in this vein was a first-ever on-site dance performance at the preserve: [the play Liriope](#) (written and produced by visiting artist **Bonnie Kwong**) with original music by **Chris Chafe** and his students (Stanford Department of Music). The performance took the audience on an enchanting walk at sunset as the dancers interpreted Greek myths about Liriope and Narcissus to express how people have impacted natural systems. And we worked with Stanford Continuing Studies to institute two new classes at Jasper Ridge, [Nature Writing](#) (WSP 70 taught in Fall 2018 by **Lynn Stegner**) and Jasper Ridge Nature Photography Workshop (anticipated in 2019 by **Joel Simon**).

In addition to Stanford students, at least 809 visits were by students from other schools who made use of Jasper Ridge for educational programs (at least 583 primarily from high schools, many of them under-represented minority students, and at least 226 from other universities or colleges). About 3,396 non-student visits provided learning opportunities for a wide spectrum of users from both within and outside Stanford through docent-led tours, meetings, or departmental retreats held at Jasper Ridge. Our approximately 10 miles of trails saw a minimum of 1,585 visits recorded on trail registers during the year.

Responding to requests from our constituency, communication efforts were enhanced, the open house mentioned above being one very big success. We've also instituted a social media presence—you can follow us on Twitter and Instagram @stanfordjrbp. And, we've increased the frequency of [news](#) postings on our website and added [blogs](#) to provide regular updates on the kinds of activities that germinate at Jasper Ridge. We hope you enjoy keeping abreast of preserve activities through these online sources during the coming year.



# Conservation Highlights

Efforts to reduce the spread of Slender False Brome, French Broom, and Stinkwort continue, and thanks to the strong backs and willing minds of many of our volunteers, vigilance and weed-pulling are beginning to pay off. The numbers of these invasive plants this year seemed to be less widespread than in past years.

Wildfire remains a grave concern: this year three fires broke out just outside the preserve's boundaries, but thanks to rapid responses by fire crews were extinguished before they made it into Jasper Ridge. We continue to work with CALFIRE, Woodside Fire, and our neighbors to reduce the risk of fire, this year implementing fire-fuel reduction efforts along our entrance road, along parts of our southern border, and on acreage in our northeastern sector, the Boething site. Instrumental in these efforts has been the collaboration of Woodside Fire Marshall **Denise Enea** and crews from CALFIRE and Woodside Fire, who thinned understory and advised us on appropriate fire-fuel reduction.

New in our approach to preventing wildfire was the temporary re-introduction of missing mammalian herbivores to the Boething site—in this case domestic analogs for large mammalian grazers like elk and pronghorn, which long ago were native to Jasper Ridge and likely significantly reduced the amount of flammable understory. The modern proxies were about 750 goats systematically herded through the thirteen acres of the Boething site, effectively mowing down invasive Black Mustard and Italian Thistle within two weeks. Left standing for the most part was Stinkwort and Yellow Star-thistle, which was then easily weed-whacked by the shepherd. While the approach was clearly effective in reducing fire fuels, we are still monitoring the goats' impacts on invasive species through assessing growth in areas from which the goats were excluded, and through experiments to assess what plants germinate from the seeds incorporated in their fecal pellets. Drawing meaningful conclusions will take several more years of continuing the experiments.

# Congratulations

## **Jordana Meyer, Biology, PhD Student: Recipient of the Philippe Cohen Graduate Research Fellowship.**

“My research at Jasper Ridge focuses on untangling the mammalian foodweb with DNA metabarcoding, which is helping to understand details of community structure. In the bigger picture this is important because rapid urbanization worldwide poses a tremendous threat to species richness and is disrupting fragile interactions among species. Complex species interactions establish the foundation of functioning communities and ecological processes, which are critical to understand if we are going to develop effective methods of protecting natural systems. The population dynamics of pumas (an apex predator) at Jasper Ridge provide a natural experiment to reveal the downstream effects on the robustness of the community. My project aims to detail species interactions across multiple trophic levels in order to learn about community structure and the health of mammal populations within Jasper Ridge. To determine species interactions and parasite load, I collected scat samples from four predator (puma, bobcat, coyote, fox) and three prey (deer, brush rabbit, jackrabbit) species. I am using a DNA metabarcoding approach to analyze these scat samples for diet and to provide a means for identifying individual species (mammals, arthropods, parasites, plants). I am also employing a multilayer network-based approach to analyze trophic network interactions to infer community structure. Emerging results are shedding light on the complex dynamics of the predator-prey interactions within a preserve surrounded by different anthropogenic land use and showcases the importance of protected areas like Jasper Ridge.”

## **David Tattoni, Earth Systems Program, Undergraduate Student: Recipient of a JRPB Mellon Grant.**

“In 1998, worldwide amphibian die-offs signaled the rapid spread of a fungal pathogen called *Batrachochytrium dendrobatidis* or Bd. However, this pathogen does not affect all species equally. Species like the California slender salamander (*Batrachoseps attenuatus*) have persisted without any documented impacts. Interestingly, these salamanders have a 100% mortality rate when infected in laboratory environments. My research at Jasper Ridge investigates potential environmental factors that enable slender salamanders to recover in the wild. After swabbing a salamander’s skin for the presence of Bd I place an ibutton data logger within its microhabitat to track temperature and humidity. Results from this study may help with amphibian conservation in the future.”

## **Cindy Wilber, JRPB Education Coordinator: Recipient of the Stanford University School of Humanities and Sciences Arnice P. Streit Service of Excellence Award.**

Cindy was recognized for her two decades of exceptional work at Jasper Ridge, where she has opened many students’ eyes to nature and to career paths in environmental science, helped to diversify the next generation of field scientists, built partnerships across generations and countries to expand science education, and encouraged people to succeed by caring for them as whole individuals. This is one of the highest honors for staff in the School of Humanities and Sciences.

# Financials



<sup>1</sup> Only funds controlled by JRBPs in direct support of maintaining the preserve for users. Most users fund their work from non-JRBPs sources.

<sup>2</sup> Includes \$37,219 (expenses) and \$57,147 (revenues) administered by Biology but restricted for use by JRBPs.

<sup>3</sup> Not included is a new 2-year grant from the Bechtel Foundation for \$306,770, which will be reported in Revenues and Expenditures as funds are received and spent in fiscal years 2019 and 2020.

## Infrastructure

Leslie Shao-ming Sun Field Station saw some interior upgrades this past year. The Martin Family Library was revamped to serve as a much-needed conference room as well as continuing to house the preserve's library, and now features the beautifully refinished "coevolution table" (where Paul Ehrlich and Peter Raven worked to formulate the idea of coevolution) and matching bookcases. The Kriewall-Haebl Family Seminar Room has been furnished to add office space for researchers. In the lab area, workspace devoted to processing and storing archival materials was installed. And the entry to the field station was rearranged to be more welcoming, including moving the administrative office to an area near the building's main entrance. All of these modifications were accomplished with repurposed materials, in keeping with the preserve's philosophy of minimizing our environmental footprint. The next few months will see a major project to install fire alarms at the ranger residence and corp yard, plus an entirely new fire alarm system for the Sun Field Station with enhanced safety features.

Outdoors, signage was improved at entry gates, and addresses were assigned at most gates to improve emergency response. We added two more live-video cameras to aid in early detection of wildfires, and four more permanent wireless camera traps. A new wireless weather station was installed on Searsville Dam, and wireless infrastructure within Jasper Ridge was expanded to improve service in several areas. The new cameras, weather station, and expanded wireless network already have proven useful in supporting ongoing research and monitoring.

We welcomed new staff to Jasper Ridge this year as activity levels increased: Dorian Golan as an Administrative Projects Manager, Simon Morgan as Special Projects Coordinator, and Kelly McManus Chauvin and Kevin Leempoel as postdoctoral scholars. And, we bid farewell to Siri Huntoon, who has been our Administrative Associate for the past few years, as she advanced to a new position in the Earth Systems Program.

# Advisory Groups and Staff

## **Faculty Advisory Committee**

NICOLE M. ARDOIN Graduate School of Education

ALEXANDRIA BOEHM Civil and Environmental Engineering

MARK DENNY Hopkins Marine Station

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STEPHEN A. FELT Comparative Medicine

SCOTT FENDORF Earth System Science

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TADASHI FUKAMI Biology

ROSEMARY KNIGHT Environmental Geophysics (rotated off in 2018)

ALEXANDRA KONINGS Earth System Science

ERIN GILMOUR MORDECAI Biology

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DMITRI PETROV Biology

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NONA CHIARIELLO JRPB Staff Scientist (ex-officio)

# Advisory Groups and Staff

## Community Coordinating Council

JESSICA SHORS APPEL San Francisco Water Department

LEONIE BATKIN Stanford Asset Management

ANGELA BERNHEISEL California Department of Forestry and Fire Protection (rotated off in 2018)

RICK DEBENEDETTI Woodside Trail Club

DENNIS DEBROECK Peninsula Open Space Trust, Board Chair; PIE Ranch, Board member; Retired Senior Corporate Partner, Fenwick & West LLP

DENISE ENEA Woodside Fire Protection District

MARY ELLEN HANNIBAL Citizen science, nature writer

JERRY HEARN Acterra and Jasper Ridge docent

JEAN MCCOWN Stanford University Government/Community Relations

BETSY MORGENTHALER Jasper Ridge docent

TRISH MULVEY Palo Alto Community volunteer

HELEN NUCKOLLS, SLAC National Accelerator Laboratory

DIANE RENSHAW Jasper Ridge docent

HEYWARD ROBINSON Vice President, Oakbio Products; former mayor of Menlo Park; and former Chairman, San Francisquito Creek Joint Powers Authority

JEANNE SEDGWICK Neighbor and Jasper Ridge docent

DAVID SMERNOFF Grassroots Ecology

LYNN STEGNER Stanford Continuing Studies Program; author; editor; and literary consultant

MATTHEW TIEWS Associate Vice President for the Arts, Stanford University

KARINE TOKATLIAN Midpeninsula Regional Open Space District

SUSAN WITEBSKY SLAC National Accelerator Laboratory

ERIC WRIGHT Senior University Counsel, Stanford University

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TOM ZIGTERMAN Stanford University Water Resources and Civil Infrastructure

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NONA CHIARIELLO JRBП Staff Scientist (ex-officio)

ELIZABETH HADLY JRBП Faculty Director (ex-officio)

## Staff

ELIZABETH HADLY Faculty Director

ANTHONY BARNOSKY Executive Director

KELLY McMANUS CHAUVIN Postdoctoral Scholar

NONA CHIARIELLO Staff Scientist

BROOKE FABRICANT Resident Ranger

DORIAN GOLAN Administrative Program Manager

STEVEN GOMEZ Operations Manager

TREVOR HÉBERT Academic Technology Specialist

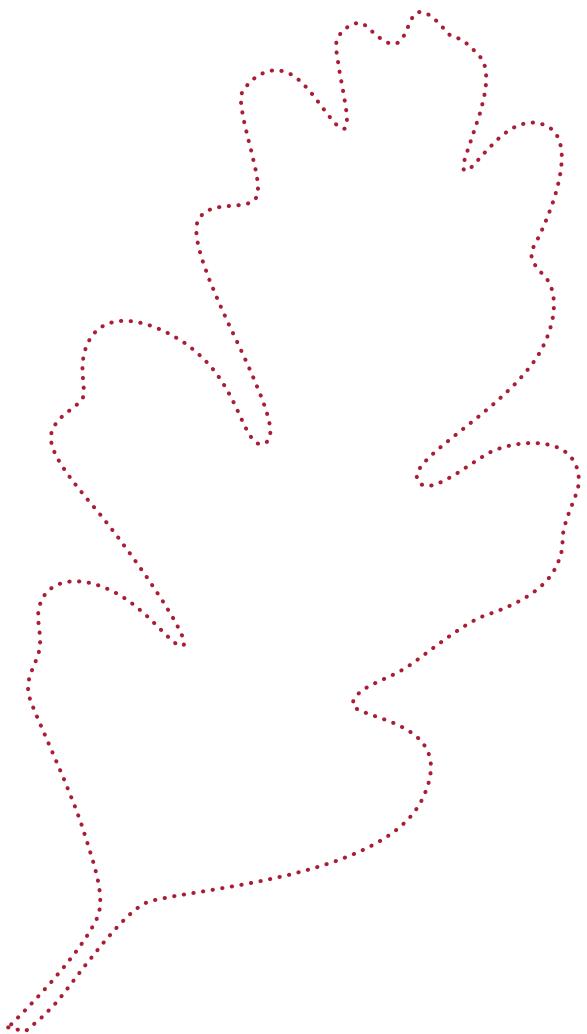
SIRI HUNTOON Administrative Associate

KEVIN LEEMPOEL Postdoctoral Scholar

SIMON MORGAN Special Projects Coordinator

JEFF VANCE Special Projects Technician

CINDY WILBER Education Coordinator





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