

Ken Norris Center for Natural History 2015-2016 Annual Report

The Norris Center was established in March 2014 with the support of the Packard Foundation to expand on UC Santa Cruz's long commitment to natural history teaching and experiential learning. The center is dedicated to cultivating natural history skills for students of all ages, fostering each student's passion for the natural world, and supporting natural history research that serves as the basis for understanding the complex and rapidly changing ecosystems around us. Below we summarize progress toward our goals in the past year and discuss plans for the coming year.

- 1. Create a dynamic, on-campus natural history resource center that includes a reference library, meeting and learning space, and access to the campus specimen collections.*

We have succeeded in creating a vibrant hub for natural history on campus. In addition to the extensive class use of the center and regular curation groups (discussed below), many other groups used the space and collections, such as the Santa Cruz Chapter of the Society for Conservation Biology, the Monterey Bay Area Educators, the COSMOS summer science program, several homeschool classes, and the Los Gatos-Saratoga 55-plus group. Thanks to a donation from the March Conservation Fund, we are able to hire student workers to keep the Norris Center open three or four days each week for six hours a day throughout the year, even at times when the Center Director is teaching or in the field. During open hours the space is nearly continuously occupied by students and other volunteers. In total, the Norris Center logged 5,478 user days during the 2015-2016 academic year. In addition to formal activities, many students use the space to study and socialize.

- 2. Support more hands-on learning opportunities through internships and laboratory and field activities in undergraduate classes; work to expose undergraduates to natural history training opportunities early in their college careers*

The Norris Center continues to support a large number of UCSC classes (26), which are primarily in the Environmental Studies (ENVS) and Ecology and Evolutionary Biology (EEB) Departments, but also include an Earth and Planetary Sciences (EPS) class and 10 sections of an Introductory Art (ART) course. Our collections were also used by Science Illustration and Vertebrate Biology courses at CA State University Monterey Bay. In addition to formal classes, the student-led Natural History Club met weekly in the Norris Center and offered natural history training to students of all class levels. Ten ENVS and EEB students did internships, developing skills in curating fungi, insect, and mammal collections, and six senior interns completed natural history projects under the supervision of Administrative Director Lay. Three curation groups meet regularly at the center, focusing on bryophytes, vascular plants, and fungi; these groups include graduate students and community members from the CA Native Plant Society and the Fungus Federation of Santa Cruz, and provide excellent training opportunities for the undergraduate participants.

We developed an online list of natural history and field courses at UCSC to help students learn about and select field courses that are best suited to their interests. We hosted three special events that provided opportunities for undergraduates to interact with a broad range of naturalists. Our fall student-alumni mixer was attended by over 30 alumni and 30 students; four alumni briefly shared career advice and there were lively one-on-one discussions. In winter 2016, undergraduate students and Chris Lay organized our second Natural History Symposium which was attended by ~120 undergraduate and graduate students, faculty, alumni, and

community members. Seven undergraduates gave presentations on their projects, and a highlight was the keynote address by renowned natural historian John Muir Laws. In April 2016, during UCSC Alumni weekend, we collaborated with the UCSC Natural Reserves to host the campus's first bioblitz, a day-long field event to digitally record local plant and animal distributions.

3. Competitive grants program

We made [eight student awards](#) (Appendix 2) to support a diverse set of projects, ranging from a poster about the Esselen people who lived along the California coast; to research projects on elephant seal microbiomes, tick-borne diseases on campus, and cactus pollination; to an identification guide for common insects and plants at the UCSC Farm and Garden. The spider guide project that was funded last year resulted in a professional-quality book which is now widely available (including on Amazon.com). One student produced a guide to the natural history of Pogonip County Park adjacent to the UCSC campus, which is now available [online](#) and in print; it is being used by the Santa Cruz Museum of Natural History for docent-led tours of the park. These awards provided important support for student projects sponsored by seven different faculty in the ENVS, EEB, and Ocean Sciences Departments. We are developing an online database of the various theses, posters, and displays produced so that they are available to a wide audience and can serve as models for students applying for grant funding in the future.

4. Support Field Natural History and Ecology Teaching

Over the past year Chris Lay has been developing a Manual of Best Practices for Safe Field Teaching in consultation with Sara Souza at UC Berkeley, who is working on field risk management for UC-systemwide, and staff in Environmental Health and Safety at UCSC. Lay attended the National Outdoor Leadership School Wilderness Risk Management Conference in fall 2015, wrote a draft of the manual during winter 2016, and received feedback from UC-wide risk management staff and UCSC faculty in spring 2016. He recently coordinated a meeting attended by several UCSC faculty and staff involved in field teaching and risk management. The current version of the manual will be completed and made available by the end of September 2016, but there will be future revisions and additions based on user feedback. During winter 2016 Mr. Lay also taught a 4-hr field risk management class which was attended by UCSC staff from the Office of Physical Education and Recreation, the Natural Reserve System, and NRS and Doris Duke Scholars Program.

The Norris Center supported Natural History Field Quarter (NHFQ) by providing teaching, meeting, and group project space when the class was in Santa Cruz in-between trips. Various field courses made use of the natural history collections, library, and field equipment.

5. Curate important collections

As discussed previously, ongoing curation groups have made substantial progress on the bryophyte, fungus, and plant collections. The herbarium collection database is now available online through the North American Network of Small Herbaria. Mr. Lay worked with one ENVS and three EEB students to update the faunal collections to make them more useful for teaching the herpetology, ichthyology, and mammalogy classes.

Our collections focus of this year and next year is on the Randall Morgan Insect Collection, which is our most valuable collection for research and conservation. Santa Cruz naturalist Randall Morgan collected over 70,000 insects (primarily pollinators) from 39 sites between 1989

and 1999, and made detailed notes on plant-insect associations. Currently two Ph.D. students are using this collection for their research, and we expect to see more over time. We enhanced ongoing maintenance on the collection and devoted considerable time to developing a plan for identifying, curating, and fully digitizing it. Mr. Lay attended an iDigBio conference to learn more about digitization protocols and consulted extensively with experts at iDigBio and UC Berkeley to develop a plan. We wrote a grant to the Institute of Museum and Library Services (IMLS) for \$100,000 and raised nearly \$35,000 in matching funds from individual donors to fully curate and digitize the Randall Morgan Insect Collection. We just recently learned that the IMLS was funded, so we will be moving forward in fall 2016 on rehousing and completing the first stage of sorting the collection. This project will provide three quarters of graduate student support for a student to work on the collection and mentor/supervise undergraduates.

6. Outreach with broader community

Many Santa Cruz community members have participated in ongoing and one-time Norris Center activities. A few of our student award winners have written content for [Mobile Ranger](#) a web app that provides information about the natural and human history of the Santa Cruz area to a general audience. In addition, our outreach this past year has focused on two specific programs.

First, we have been working with staff at the Santa Cruz Museum of Natural History (SCMNH) to update their first grade field trip program about local animals to include inquiry-based techniques and align with Next Generation Science Standards. Two UCSC senior interns worked with SCMNH Education staff to develop the curriculum, pre-field trip activity kits, and a docent training manual for the [“Our Animal Neighbors”](#) program. In spring 2016, the students helped to teach the curriculum to 20 classes and to solicit feedback from teachers. The new program received excellent reviews from all teachers who participated. Two additional senior interns will be working over the next year to make curriculum revisions, deliver the curriculum to at least 40 classes, and develop additional program evaluation materials.

Second, the Norris Center provided support in program development and fundraising support for the Bird School Project, a program started by two Environmental Studies alumni, which inspires 7th-12th grade students and teachers to develop a scientific understanding and appreciation of their local environment through learning about birds in their schoolyards. This year the Bird School Project delivered their curriculum to ~1400 students at 11 schools in the Monterey Bay region. Ten UCSC interns gained teaching experience through the program.

7. Actively fundraise

This year the Administrative Director Chris Lay’s salary was underwritten by interest from the Norris Center Endowment funded by the Packard Foundation, a donation from a private donor, a grant from the Helen and Will Webster Foundation, and support from the Environmental Studies and Ecology and Evolutionary Biology Departments and the Social Sciences and Physical and Biological Divisions at UCSC. We received support from the March Conservation Fund which covered our annual operating expenses, including hiring student assistants.

We continue to raise funds to fully support the salary of the Administrative Director and specific projects of the center, through both grants, private donors, and appeals to alumni. As noted earlier, we have focused particularly on raising funds to curate the Randall Morgan Insect Collection. We are planning a fundraising event and open house for fall 2016 focused on this collection and the artwork of renowned natural history artist Maryjo Koch.

Appendix 1. Advisory Committee Members

Norris Center Executive Committee

Jenny Anderson, retired Environmental Studies staff & instructor and representative of the Friends of the Norris Natural History Programs

Karen Holl, Norris Center Faculty Director and Professor of Environmental Studies at UCSC

Bruce Lyon, Professor of Ecology and Evolutionary Biology at UCSC

Chris Lay, Norris Center Administrative Director

Richard Norris, Professor of Geosciences at UC San Diego and representative of the Friends of the Norris Natural History Programs

Appendix 2. Norris Center Student Project Awards for 2015-2016 Academic Year. For project descriptions click [here](#).

Student	Faculty sponsor	Major	Project Title
Evan Silk	Chris Wilmers	ENVS	A poster about the Esselen people at the Big Creek Natural Reserve
Kylie Smith	Jeff Bury	ENVS	Our community is our home: a field guide to the communities of Pogonip
Laurel Wee	Jeff Bury	ENVS/BIO	Branching out in Santa Cruz. The urban trees of Santa Cruz - a walking tour
Adam Taylor	Marilou Sison-Mangus	Microbiology	Tracking upper respiratory tract microbiome changes in Northern Elephant seals
Rosalyn Bathrick	Michael Loik	ENVS	Nectar by night: plant pollinator interactions in the Baja Peninsula
Vanessa Cabrera	Beth Shapiro	EEB	Investigating vector-borne diseases on the University of California, Santa Forest Ecology Research Plot
Mike MacDonald	Stacy Philpott	ENVS	Identification guidebooks for common insects and plant species at the UCSC CASFS farm
Devin Chance	Eric Palkovacs	EEB	Using a natural geothermal laboratory to understand the effects of temperature on invasive mosquitofish sex ratios
