

University of Southern California  
Maymester 2025  
BISC364 – Advanced Techniques in Field Mammalogy (4 units)

**Instructor**

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**Please note:** We can easily schedule office hours by appointment to accommodate your schedules.

**Times**

Lab: Tuesdays 10:00 am – 2 pm, Natural History Museum of Los Angeles County (**NHMLAC**)  
Education Room

Field: leaving campus Wednesday morning – returning campus by Friday around noon

**Course Description**

This course will introduce students to field skills and museum-based curation resources used to investigate questions in population biology. The course will combine training at the Natural History Museum of Los Angeles County with field-based investigations in several contrasting Southern California habitats. This combined approach introduces students to authentic tools used by scientists working in conservational biology fields and concepts related to wildlife biology management.

In the lab component of this course, students will be given hands-on instruction in the NHMLAC collections, which are an integral component to studying natural history. Students will handle real skulls, skins, and other material from a variety of mammal taxa found within California. Students will learn how to identify skeletal elements as well as unify the relationship between bone form and function. Additionally, students will be introduced to the role of geospatial data in biology and apply that knowledge in their own research projects and presentations.

The field-based aspects of this course, will provide students with exposure to learn how to trap, identify and release mammals from a variety of ecosystems. Students will identify specimens to species-level and learn about what environmental features predict species presence/diversity. At the beginning of each week (Tuesday), we will meet in the private collections of the NHMLAC to learn various topics such as the morphology, classification, distribution, and physiology of mammals. We spend the rest of the week (Wednesday through Friday) in the field, trapping (live release), identifying, and cataloguing mammals and their diversity.

**Objectives of the Course**

1. Learn how to analyze species distributions, using modern techniques in computational spatial sciences. For example, you will know how to ask “what kind of environment does a species prefer?”.
2. Learn to identify mammalian species, focusing on California species.
3. Learn the natural history of various mammalian groups.
4. Learn how to use a natural history museum reference collections, including the organization and care/maintenance of specimens.

5. Learn how to trap/document mammals in their natural environments.
6. Identify mammal species presence through direct morphological features as well as indirect signs such as scat (the formal word for poop) and tracks.
7. Articulate the ecological and evolutionary forces that have shaped mammal diversity on the planet.

**Prerequisite**

None, just natural curiosity and excitement to learn. Please note: if you are a freshman or sophomore and want to register for this class, you need to contact Matt Dean (matthew.dean@usc.edu), who will get you D clearance to register.

**Books**

Mammals of California. EW Jameson Jr. and HJ Peeters. April 2004. ISBN: 9780520235823

**Additional Costs:** Please note that this course has an additional cost of \$680. Your food, lodging, and transportation for all four field trips will be covered. Up to \$1000 is available as SOAR funding for students.

**Grading System Overview (1000 points total):**

<b>Assessment</b>	<b>Points</b>
Species quiz	50
Species #1 writeup	200
Species #1 presentation	200
Species #2 writeup	200
Species #2 presentation	200
Effort and participation	50
Student Field book	100

**Grading System Details:**

**Species quiz:** We will test your ability to distinguish 10-20 species based on museum specimens.

**Species writeup and presentation:** Each student will choose two different species that occur in California, preferably whose range includes at least one of the field sites that we will visit. For each species, students will research its ecology and evolution, including mating system to understand the effect of seasonality. Students will learn to download species occurrence data from the Global Biodiversity Information Facility (GBIF) and use statistical software in R to map out species ranges. A key component of the species-focused project is to ask whether species are uniformly distributed across their range, and if not, what environmental variables explain variation in density. This is a field of science called spatial science; given its computational nature students will receive lots of guidance if needed.

Students will write up their results, and give an oral presentation to summarize their findings to the class. Writeups will be due at the end of the course; presentations will take place during the field trips.

**Effort and participation:** Surveying mammalian biodiversity is a team effort. Setting up, monitoring, and taking down traps takes a considerable amount of time.

**Field Books:** Students will keep detailed field books documenting trap locations and success rate. Observational data such as weather, phase of the moon, etc. are also important to understand capture success. All data will be entered into a Google Spreadsheet for downstream analysis.

**Due dates:** Field Books and species writeups will serve as the final summative experience, due June 13.

**Make-up Policy:**

Labs and field trips cannot be made-up. If a student has a religious observance that prevents them from attending, they must notify the professor at least 7 days in advance and a makeup assignment will be determined. In the case of medical emergencies, we may prorate your points, but only if an excuse considered valid by faculty (i.e., doctor’s note) – and where that excuse explicitly states that the dates in question could not be attend – is presented in a timely fashion.

**Schedule overview (details follow):**

**NHMLAC**=Natural History Museum of Los Angeles County (across Exposition Blvd from USC campus)

**FT:** 3 day-2 night field trips to local UC Natural Reserves

Date	Topic
May 20	<p><b>NHMLAC: Skull features / Order Carnivora</b></p> <p><b>Themes:</b>            Logistics of course            How to safely handle live mammals            Species Features            Diet and Dentition            Tracks and Scat Identification</p> <p><b>Species:</b>            Canidae:  <ul style="list-style-type: none"> <li>• Canis sp.</li> <li>• Vulpes sp.</li> <li>• Urocyon sp.</li> </ul>           Procyonidae:  <ul style="list-style-type: none"> <li>• Procyon sp.</li> <li>• Bassariscus sp.</li> </ul>           Ursidae:  <ul style="list-style-type: none"> <li>• Ursus sp.</li> </ul>           Mephitidae:  <ul style="list-style-type: none"> <li>• Mephitis sp.</li> <li>• Spilogale sp.</li> </ul>           Felidae:  <ul style="list-style-type: none"> <li>• Puma sp.</li> <li>• Lynx sp.</li> </ul>           Mustelidae:  <ul style="list-style-type: none"> <li>• Lontra sp.</li> <li>• Mustela/Neogale sp.</li> </ul> </p>
May 21-23	<p><b>FT: Kenneth S. Norris Rancho Marino Reserve</b></p>
May 27	<p><b>NHMLAC: Reproduction / Order Rodentia</b></p> <p><b>Themes:</b>            Zygomaseteric Systems            Ecology and Regional Variation – case study in deer mice, pocket gophers.</p> <p><b>Species:</b></p>

	<p>Muridae:</p> <ul style="list-style-type: none"> <li>• Mus sp.</li> <li>• Rattus sp.</li> </ul> <p>Zapodidae:</p> <ul style="list-style-type: none"> <li>• Zapus sp.</li> </ul> <p>Cricetidae:</p> <ul style="list-style-type: none"> <li>• Peromyscus sp.</li> <li>• Microtus sp.</li> <li>• Neotoma sp.</li> </ul> <p>Heteromyidae:</p> <ul style="list-style-type: none"> <li>• Dipodomys sp.</li> <li>• Chaetodipus sp.</li> <li>• Perognathus sp.</li> </ul> <p>Geomyidae:</p> <ul style="list-style-type: none"> <li>• Thomomys sp.</li> </ul> <p>Sciuridae:</p> <ul style="list-style-type: none"> <li>• Neotamias sp.</li> <li>• Sciurus sp.</li> <li>• Otospermophilus sp.</li> <li>• Ammospermophilus sp.</li> <li>• Marmota sp.</li> </ul>
May 28-30	<b>FT: McGowan Field site</b>
June 3	<p><b>NHMLAC: Physiology / Order Chiroptera</b></p> <p><b>Themes:</b>  Physiology and Adaptation – hypoxia, jackrabbit, neanderthals, coat color.  Echolocation and sonograms  Migration</p> <p><b>Species:</b></p> <p>Molossidae:</p> <ul style="list-style-type: none"> <li>• Tadarida sp.</li> <li>• Eumops sp.</li> <li>• Nyctinomops sp.</li> </ul> <p>Vespertilionidae:</p> <ul style="list-style-type: none"> <li>• Lasiurus sp.</li> <li>• Parastrellus sp.</li> <li>• Eptesicus sp.</li> <li>• Antrozous sp.</li> <li>• Corynorhinus sp.</li> <li>• Myotis sp.</li> <li>• Lasionycteris sp.</li> </ul> <p>Phyllostomidae:</p> <ul style="list-style-type: none"> <li>• Macrotus sp.</li> </ul>
June 4-6	<b>FT: James San Jacinto Mountain Reserve</b>
June 10	<p><b>NHMLAC: Locomotion / Order Artiodactyla</b></p> <p><b>Themes:</b>  Tracks and Scat Identification  Diet and Ecology  Weaponry (horns, antlers, tusks)  Politics (game management, wildlife conflict, etc.)</p> <p><b>Species:</b></p> <p>Bovidae:</p> <ul style="list-style-type: none"> <li>• Ovis sp.</li> </ul> <p>Suidae:</p> <ul style="list-style-type: none"> <li>• Sus sp.</li> </ul> <p>Cervidae:</p> <ul style="list-style-type: none"> <li>• Odocoileus sp.</li> <li>• Cervus sp.</li> </ul> <p>Leporidae:</p>

	<ul style="list-style-type: none"> <li>• Lepus sp.</li> <li>• Sylvilagus sp.</li> <li>• Ochotona sp.</li> </ul>
June 11-13	<b>FT: White Mountain Research Center (Crooked Creek)</b>

**Natural History Museum of Los Angeles County:** Across Exposition Boulevard is one of the world’s premier natural history museums. We will go behind-the-scenes and use their collections to learn about local biodiversity. We will learn how to care for museum specimens and the value of these institutions. We start each week on Tuesday at the museum so we can learn about the species that we are likely to encounter on our field trip that week. All students will need a valid USC ID to access NHMLAC facilities.

**Field Trips:**

Each week contains a 3-day-2-night trip. In some cases this will involve camping (we have loaner gear). We will sample different ecosystems throughout California.

This class is focused on field mammalogy, where students learn to implement methods to trap (live-release) and identify mammal species. Below is more information on each of the four field trips. Each field trip will entail 3 hours of classroom instruction from the professor and TA, and will focus on local mammal diversity as well as trapping methodology. Each field trip will also entail 10 hours of trapping, collecting, and cataloguing data. Each field trip, 2-3 students will present one of their species-focused reports. Students will have “free time” to explore the local habitat on their own.

The four sites that we will visit are:

**Kenneth S. Norris Rancho Marino Reserve:** From ucnr.org: “Habitats within the reserve include an extensive rocky shoreline, freshwater ponds, coastal grasslands, a mixed Monterey pine and coast live oak forest, and northern coastal sage scrub.” This is an excellent area for voles (the second cutest rodent on the planet).

**McGowan Field Site:** We will join Dr. Craig McGowan at his field site in the Nevada desert. We will help collect a species of kangaroo rat there which is the focus of Craig’s research program – understanding the biomechanics of hopping.

**James San Jacinto Mountain Reserve:** From ucnr.org: “Habitats include mixed conifer and hardwood forest, montane chaparral, montane riparian forest, and a rapidly flowing mountain stream”. This is an excellent site for observing bats, as they swoop down and drink from Lake Fulmar.

**White Mountain Research Center (Crooked Creek):** From ucnr.org: “montane woodland and sagebrush hills. Nearby grow two groves of bristlecone pine that include the oldest trees in the world.” Likely to see bighorn sheep.

**Summary of contact hours (per week).**

Tuesday: 4 hours of laboratory learning at the Los Angeles Natural History Museum.

Wednesday-Friday: 3 hours of classroom instruction, 10 hours of trapping, collecting, and cataloguing data, 1 hour of student presentation/collaboration The rest of the field trips will be spent exploring the local landscape, we will collaborate to learn the ecology of the community.

Each week we will go through a recently published paper. We will all read the paper (~3 hours) and Dr. Dean will present the paper in an easy-to-understand manner during lab time. Each week will be a different paper, usually focused on understanding the genetic basis of various adaptations in mammals.

## Statement on Academic Conduct and Support Systems

### Academic Integrity:

The University of Southern California is a learning community committed to developing successful scholars and researchers dedicated to the pursuit of knowledge and the dissemination of ideas. Academic misconduct, which includes any act of dishonesty in the production or submission of academic work, compromises the integrity of the person who commits the act and can impugn the perceived integrity of the entire university community. It stands in opposition to the university's mission to research, educate, and contribute productively to our community and the world.

All students are expected to submit assignments that represent their own original work, and that have been prepared specifically for the course or section for which they have been submitted. You may not submit work written by others or "recycle" work prepared for other courses without obtaining written permission from the instructor(s).

Other violations of academic integrity include, but are not limited to, cheating, plagiarism, fabrication (e.g., falsifying data), collusion, knowingly assisting others in acts of academic dishonesty, and any act that gains or is intended to gain an unfair academic advantage.

The impact of academic dishonesty is far-reaching and is considered a serious offense against the university. All incidences of academic misconduct will be reported to the Office of Academic Integrity and could result in outcomes such as failure on the assignment, failure in the course, suspension, or even expulsion from the university.

For more information about academic integrity see [the student handbook](#) or the [Office of Academic Integrity's website](#), and university policies on [Research and Scholarship Misconduct](#).

Please ask your instructor if you are unsure what constitutes unauthorized assistance on an exam or assignment, or what information requires citation and/or attribution.

### Students and Disability Accommodations:

USC welcomes students with disabilities into all of the University's educational programs. [The Office of Student Accessibility Services](#) (OSAS) is responsible for the determination of appropriate accommodations for students who encounter disability-related barriers. Once a student has completed the OSAS process (registration, initial appointment, and submitted documentation) and accommodations are determined to be reasonable and appropriate, a Letter of Accommodation (LOA) will be available to generate for each course. The LOA must be given to each course instructor by the student and followed up with a discussion. This should be done as early in the semester as possible as accommodations are not retroactive. More information can be found at [osas.usc.edu](http://osas.usc.edu). You may contact OSAS at (213) 740-0776 or via email at [osasfrontdesk@usc.edu](mailto:osasfrontdesk@usc.edu).

### Support Systems:

[Counseling and Mental Health](#) - (213) 740-9355 – 24/7 on call

Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention.

[988 Suicide and Crisis Lifeline](#) - 988 for both calls and text messages – 24/7 on call

The 988 Suicide and Crisis Lifeline (formerly known as the National Suicide Prevention Lifeline) provides free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week, across the United States. The Lifeline is comprised of a national network of over 200 local crisis centers, combining custom local care and resources with national standards and best practices. The new, shorter phone number makes it easier for people to remember and access mental health crisis services (though the previous 1 (800) 273-8255 number will continue to function indefinitely) and represents a continued commitment to those in crisis.

[Relationship and Sexual Violence Prevention Services \(RSVP\)](#) - (213) 740-9355(WELL) – 24/7 on call

Free and confidential therapy services, workshops, and training for situations related to gender- and power-based harm (including sexual assault, intimate partner violence, and stalking).

[Office for Equity, Equal Opportunity, and Title IX \(EEO-TIX\)](#) - (213) 740-5086

Information about how to get help or help someone affected by harassment or discrimination, rights of protected classes, reporting options, and additional resources for students, faculty, staff, visitors, and applicants.

[Reporting Incidents of Bias or Harassment](#) - (213) 740-5086 or (213) 821-8298

Avenue to report incidents of bias, hate crimes, and microaggressions to the Office for Equity, Equal Opportunity, and Title for appropriate investigation, supportive measures, and response.

[The Office of Student Accessibility Services \(OSAS\)](#) - (213) 740-0776

OSAS ensures equal access for students with disabilities through providing academic accommodations and auxiliary aids in accordance with federal laws and university policy.

[USC Campus Support and Intervention](#) - (213) 740-0411

Assists students and families in resolving complex personal, financial, and academic issues adversely affecting their success as a student.

[Diversity, Equity and Inclusion](#) - (213) 740-2101

Information on events, programs and training, the Provost's Diversity and Inclusion Council, Diversity Liaisons for each academic school, chronology, participation, and various resources for students.

[USC Emergency](#) - UPC: (213) 740-4321, HSC: (323) 442-1000 – 24/7 on call

Emergency assistance and avenue to report a crime. Latest updates regarding safety, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible.

[USC Department of Public Safety](#) - UPC: (213) 740-6000, HSC: (323) 442-1200 – 24/7 on call

Non-emergency assistance or information.

[Office of the Ombuds](#) - (213) 821-9556 (UPC) / (323-442-0382 (HSC)

A safe and confidential place to share your USC-related issues with a University Ombuds who will work with you to explore options or paths to manage your concern.

[Occupational Therapy Faculty Practice](#) - (323) 442-2850 or [otfp@med.usc.edu](mailto:otfp@med.usc.edu)



Confidential Lifestyle Redesign services for USC students to support health promoting habits and routines that enhance quality of life and academic performance.