EFB 500 Amazon Rainforest Field Research (4 credits)
Online component: January 2, 2024 -May 6, 2025 (Weekly virtual meetings)
Field component: March 6-16, 2025
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Course Overview
The aim of this course is to provide students with the opportunity to apply the scientific process in a tropical field research setting. This course prepares students to distinguish hidden assumptions in scientific approaches, test hypotheses, cause from correlation, and advocacy from objectivity. Ultimately, this course will allow students to contribute to a growing body of scientific research that helps inform local conservation efforts in the Madre de Dios, Peru (https://www.tropicalconservationfund.org/puertomaldonado.html).

This course includes intensive practical field experience conducting research in Southeastern Peru on a topic of immediate relevance to specific clients in the area working in the context of tropical ecology and conservation biology in the Amazon Rainforest. Students will first go through the steps of the research process by identifying relevant questions within the ecological context of the region; research design and proposal writing; field data collection; methods of qualitative and statistical data analyses; and presentation of results to the interested parties and the scientific community. To achieve this, students will integrate information provided in the online lecture/recitation components and will apply it to their research design. In their research projects, students will integrate concepts and methodologies learned in class (with synchronous and asynchronous online components) and be introduced to field exercises that will be needed to deliver a technical report and end-of-semester presentation.

Research Projects
I currently run several lines of primate-based research in the region which you can review at https://www.researchgate.net/profile/William-Helenbrook and https://www.tropicalconservationfund.org/research.html. Your research questions need to overlap to some extent with these projects, though there is flexibility. There are nearly a dozen diurnal monkey species in the region, some of which are endangered. With that in mind, questions will likely address behavioral ecology, ecological niche modeling, ranging patterns, activity budgets, habitat analysis, parasitology, bioacoustics, or conservation genetics.

Potential Research Topics
- Understand the behavioral ecology of monkey species in Peru, including their social structure, foraging strategies, and habitat preferences
- Gain insight into the dietary preferences and nutritional requirements of different monkey species in Peru, and how these preferences influence their ecological roles and interactions with other species
- Investigate prevalence and impact of intestinal parasitism on the health and fitness of monkey populations in Peru
- Explore the use of acoustic signals for communication and coordination among monkey groups in Peru, and assess the implications of anthropogenic noise pollution on their acoustic communication systems
- Examine activity budgets of monkey species in Peru, including their daily routines, time allocation patterns, and responses to environmental changes and disturbances
- Investigate factors driving ranging patterns and spatial behavior of monkey populations in Peru, and assess the implications for their conservation and management

- Analyze the cultural diversity and transmission of behavioral traits within monkey populations in Peru, and explore the mechanisms underlying social learning and innovation
- Evaluate the role of monkey species in Peru as indicators of ecosystem health and integrity, and assess their vulnerability to environmental threats and disturbances
- Examine the effects of human activities, such as habitat loss, hunting, and climate change, on the behavior, ecology, and conservation status of monkey species in Peru
- Develop interdisciplinary research skills by integrating methodologies from fields such as behavioral ecology, ecological modeling, parasitology, acoustics, and conservation biology to address complex questions related to monkey species in Peru
- Examine gastrointestinal parasites and composition in relation to geographic distribution of hosts
- Diet analysis and impact of digestion on seed germination success
- Assessment of vocal diversity and response to predator calls
- Behavioral analysis and the effects of lunar luminosity on nocturnal monkeys
- Perform biotic surveys associated with wildlife and forest management that are used to understand impact of changing habitats
- Measure forest structure parameters using several indicators (e.g., basal area, canopy cover, and qualitative analysis)
- Employ field research methods and analytical tools, including qualitative and quantitative methods, that are used in the field of conservation biology and ecology

Assessment Item	Value (%)
Literature Review	15
Research Proposal	25
Field Exercises	25
Technical Report	25
Presentation	10
Total	**100**

Assessment Descriptions

Literature review with project proposal

The main objective of the Literature Review is that students familiarize themselves with previous research and publications in the area of their chosen research project. The literature review should draw upon a large literature base (where possible) – firstly to review the current status of research in the field, and then to build a background and justification for research that still remains to be done. Further details can be found in Blackboard.

Research Proposal

Your research proposal will be a detailed plan for a study designed to investigate a specific scientific question or problem. It outlines the objectives, methodology, significance, and expected outcomes of the research. The proposal begins with an introduction that provides background information and states the research problem. It includes a literature review to contextualize the study within existing research. The methodology section describes the procedures and techniques to be used for data collection and analysis. The proposal also discusses the potential implications and applications of the research findings. Additionally, it includes a timeline and budget to outline the project's feasibility. A well-prepared proposal is essential for securing funding and institutional approval for the research.

Poster Presentation

Create a Powerpoint presentation with accompanying visuals that will be made available to partners at the end of the semester. Emphasis will be made on setting the context (introduction), results, implications, and conclusions. Attention should be paid to the visual design and composition of figures and images. The

correspondence of visuals with the idea presented, plus the logical flow of ideas and sections within the poster will be evaluated.

Technical Report
Building on the research proposal, your technical report should include your results, incorporating data, tables, graphs, and statistical analysis. The discussion interprets the results, compares them with previous studies, and discusses implications, limitations, and suggestions for future research. The conclusion summarizes key findings and provides recommendations. References list all cited sources, and appendices include supplementary material like raw data or detailed methods.

Schedule

Activity	*Dates*
Introduction to course	Wednesday, January 2, 2025
Team meetings (Blackboard: Remote)	Every Wednesday until April 29th (with exception of Spring Break)
Project selection	January 30, 2025
Project proposal Due	February 27, 2025
Field (Exercises and data collection)	March 7-19, 2024
Final assignments due	April 29th

Course contents

	Hrs	*Lecture Title and Description*	*Readings*
Discussion	**1**	**Introduction to DR** Course objectives, design, pace, selection of topics, evaluation	Lafferty (2009); Shanee, et al. (2014)
Discussion	**1**	**Science** Truth, reality, knowledge, pattern, process, evidence, observation, and experimentation. The goals, methods and power of science	Sagan (1995)
Discussion	**1**	**Reality or delusion:** statistics as the quantitative tool to find truth	Levi (2009); Turner et al. (2007)
Discussion	**2**	**Qualitative and Quantitative methods:** We will explore intensive and immersive methods that help researchers utilize different types of field data	Crang, 2002; Chapman and Peres (2001)
Discussion	**1**	**Research ethics** In the second half of this class, we will explore the parallel issues of voice, representation, and power in the practice of qualitative research	Costello et al. (2016); Garcia-Yi and Grote (2012); Lindenmayer et al. (2006)
Discussion	**1**	**The beauty of quantities** Communicating patterns and processes visually with graphs and posters	Buckland et al. (2010)
Discussion	**1**	**Publishing** Writing scientific papers	Rosenthal et al. (2012)

	Hrs	*Lecture Title and Description*	*Readings*
Discussion	**2**	**Directed research topics**	Salafsky (2010); Sarno et al. (2015)
Discussion	**5**	**Research project development**	
Field	**20**	**Field exercises**	
Field	**25**	**Data collection**	
	60	**TOTAL CONTACT HOURS**	

Course Readings

Buckland, S., Plumptre, A., Thomas, L., and Rexstad, E. (2010). Design and analysis of line transect surveys for primates. International Journal of Primatology 31: 833-847.

Chapman, C. and C. Peres (2001). Primate conservation in the new millennium: the role of scientists. Evolutionary anthropology 10: 16-33.

Costello, M. J., et al. (2016). Field work ethics in biological research. Biological Conservation, 203, 268-271. doi:10.1016/j.biocon.2016.10.008

Crang, M. (2002). Qualitative Methods: The New Orthodoxy? Progress in Human Geography, 26(5): 647-655.

Garcia-Yi, J. and U. Grote. (2012). Data Collection: Experiences and Lessons Learned By Asking Sensitive Questions in a Remote Coca Growing Region in Peru. Survey Methodology, 38(2): 131-141.

Lafferty, K. (2009). The ecology of climate change and infectious diseases. Ecology 90: 888-900.

Levi, T., Shepard Jr, G. H., Ohl-Schacherer, J., Peres, C. A., & Yu, D. W. (2009). Modelling the long-term sustainability of indigenous hunting in Manu National Park, Peru: landscape-scale management implications for Amazonia. Journal of Applied Ecology 46: 804-814.

Lindenmayer, D., Franklin, J., and Fischer, J. (2006). General management principles and a checklist of strategies to guide forest biodiversity conservation. Biological Conservation 131: 433-445.

Rosenthal, A., Stutzman, H., and Forsyth, A. (2012). Creating mosaic-based conservation corridors to respond to major threats in the Amazon headwaters. Ecological Restoration 30: 296-299.

Sagan, C. (1994). Demon hunted World: Science as a candle in the dark. Random House.

Salafsky, N. (2010) Integrating development with conservation: A means to a conservation end, or a mean end to conservation? Biological Conservation 144: 973-978.

Sarno, Ronald J., David E. Jennings, and William L. Franklin. (2015). Estimating effective population size of guanacos in Patagonia: an integrative approach for wildlife conservation. Conservation Genetics 16: 1167-1180.

Shanee, N., Shanee, S., and Horwich, R. (2014). Effectiveness of locally run conservation initiatives in north-east Peru. Oryx 1-9.

Turner, W. R. et al. (2007). Global conservation of biodiversity and ecosystem services. BioScience 57: 868-873.