Syllabus

BIO 296 (4 credits)

**Marine Mammal Biology**

CE Study Abroad Course in Panama

UVM Summer Mon. May 28 to June 15, 2019

Instructors Instructor

Laura J. May-Collado, Ph.D. Heather Daszkiewicz

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**Pre-requisites**: Undergraduate junior or senior levels. BCOR 102, BCOR12 or WFB 150.

**Course Description**:

Marine mammals are not just beautiful and charismatic; they also share a remarkable evolutionary history that led them back (independently) to the ocean millions of years ago. The return to the sea involved a number of dramatic modifications in their anatomy, physiology, and communication. Ecologically, these animals play crucial roles as top predators, keystone species, and ecosystem engineers. Did you know that large whales contribute to nutrient cycling in the oceans through their poop and carcasses? For this reasons scientists are concern about how population declines of whales can potentially disrupt how nutrients are made available to nutrient poor waters. In terms of conservation, aquatic mammals are top conservation priorities among mammals. One species is already functionally extinct, the Yangtze river dolphin and several others are at the brink of extinction (e.g., the Vaquita and Mediterranean monk seals, Northern Right Whales). Whaling, overexploitation of their food supplies by fisheries, and habitat lost due to pollution (e.g., plastic, metals, noise) and climate change are among the factors threatening these animals.

The goal of this course is to introduce you to the biology of aquatic mammals, their habitats, the communities that rely on them economically, and to get you involved in field research. The course is primarily for advance undergraduates but graduate and sophomores can enroll with permission from the instructor. I want to enfasize that **this is not a recreational course** you will spend **8 hours or more at day** participating in boat surveys collecting field data on behavior, acoustics, and abundance. Days are hot and humid, and our boats have a small roof not enough to cover everyone. Students that register for this course must have a serious commitment to the course. Often there is a misconception that the dolphins will ‘perform’ as dolphins in aquaria or that students will be swimming with them. That’s not how research on marine mammals works! Studying dolphins can be tedious, they can be hard to find, and once you do they might have other plans and swim away within seconds; and NO we do not swim with dolphins in this course, we want to reduce our impact as much as possible.

 The first week of classes we will be on campus introducting you the biology marine mammals and to the methods that will be used during our surveys. On June 1st we’ll head down to Panama, to my study site in the Archipelago of Bocas del Toro where we will make our home at Bocas Marine Station of the Smithsonian Tropical Research Institute located in the main island, Isla Colon. I have been studying dolphins in Bocas for almost 16 years, we know almost every single animal and how they relate to each other. This population is at risk of extinction and your participation in this course will contribute to generate biological information to designed management strategies that help protect this dolphin population and their habitat.

**Calendar**

Tentative schedule: Field Marine Mammal Biology (Biol 296)

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| **May 27**On campusIntro to the Course Marine Mammals of the WorldEvolution of Marine Mammals | **May 28**On campusFunctional Morphology and Solutions to physiological problems Reproduction and Behavior | **May 29**On campusSensory Systems and Communication | **May 30**On campus**Exam**Intro to the Dolphins of Bocas del Toro:PhotoID, Behavioral Observations, and Acoustic Monitoring | **May 31**Get ready for travel to Panama |
| **June 1**To PanamaSpend night at house at the University Maritime International of Panama | **June 2**Flight to BocasSTRI Orientation OrientationReview of Dorsal Fin Catalogue and Survey assignments | **June 3**Field WorkNight: discussion of independent projects | **June 4**Field WorkNight: Write up 1- page proposal with presentation/discussion | **June 5**Field WorkNight: Student PPTSpecies PresentationData EntryBlogging |
| **June 6**Field WorkNight: Student PPTSpecies Presentation/guest TalkData EntryBlogging | **June 7**Field WorkNight: Student PPTSpecies PresentationData EntryBlogging | **June 8**Field WorkNight: Student PPTSpecies PresentationData EntryBlogging | **June 9**Field WorkNight: Student PPTSpecies PresentationData EntryBlogging | **June 10**Field WorkNight: Species PresentationData Entry& Data AnalysisBlogging  |
| **June 11**Field WorkNight: Species PresentationData Entry& Data AnalysisBlogging | **June 12**Field WorkNight: Data Entry& Data AnalysisPresent update on Data AnalysisBlogging | **June 13**Data Analysis and Write up**Night: submission of ms. draft.**Night meet up with instructors | **June 14**Submission of Final Ms.Night: **Symposium** | **June 15**Back Home |

**Learning goals of this course:**

1. Learn about the evolution, ecology, and behavior of marine mammals in tropical waters of Panama.
2. Observe the conservation treats that these animals face every day and brainstorm about the what can be done to protect them.
3. To offer the opportunity to learn about the challenges and efforts that take to study these animals in their natural environment.
4. Engage students in all aspects of marine mammal research: literature reading and discussion, asking questions, collecting, processing, and analyzing data, learning how to interpret analytical results and how to communicate the results.
5. Learn that science is not about eureka moments! Good science takes time, involves failure, troubleshooting, discussions, re-evaluations, and yes frustration. Good science is always challenging at different levels, from collecting the data to its analysis.
6. Learn that not all research projects are equal! Different questions, systems, or species will require different approaches. My research is field based so is bound to be limited by replication, sample size, lack of controls (because there are impossible to have!), logistics! However, field based projects are essential for our understanding of our biological world, and are often the spark for more sophisticated and controlled studies.

**Grading**

1 Exam: 100 pts

Blogging: 50 pts

Species of the Day: 50 pts

Participation/actitude: 100 pts

Independent Field Project: 300 pts [Proposal (100), Writen Ms (100), Oral PPT (100)]

Total:600 pts

**Student Behavior:**

Students are expected to comply with UVM Code of Academic Integrity, as requested by Dr. May-Collado and the rules of Smithsonian Tropical Research Institute. Students are required to participate in all course activities. No drug or alcohol is allowed in this course.

**Recommended Book: This is optional.**

Reynolds J. E. and Rommel, S. A. 1999. Biology of Marine Mammals. Smithsonian Press. ($34.5 in Kindle).

**Software**: Socprog 2.4 or 2.5 compiled (free download) (not in mac), Audacity both platforms Mac and Windows free download. JMP or R or SPSS download from UVM software services.

**Instructors Bios:**

Laura J. May-Collado: Native of Costa Rica. She has over 20 years of experience working with marine mammals. She earned her master’s degree at University of Costa Rica and her Ph.D. at Florida International University. She is currently a Research Associate at the University of Vermont in the Department of Biology, and has coordinated Field Biology courses for OTS in the past. Website: [lauramay-collado.com](file:///C%3A%5CUsers%5Clmaycoll%5CDropbox%5CSummer2019-MarineMammals%5CSummer2019-Field%20Marine%20Mammals%5Clauramay-collado.com)

Heather Daszkiewicz : She is American biologists that has work with dolphins and sea turtles in the past three years in Florida. She earned her B. Sc. at University of Vermont, and took this marine mammal field course in 2015.