Project Id	125
Project Title	Hormonal and Neurological Basis for Sex Differences in Spatial Ecology in Rattlesnakes
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Additional Faculty	
Faculty Department	Biological Sciences

Project Description	For the past three years, my students and I have been studying the reproductive biology, habitat use, and physiological ecology of the Northern Pacific rattlesnake (Crotalus oreganus). This research program is ideal for students interested in a scope of topics, from wildlife biology and ecology to the health sciences. Data from the past three years show interesting trends, including the following: 1) male rattlesnakes are larger in size and occupy larger home ranges than female rattlesnakes, 2) rattlesnakes breed twice per year, in spring and fall, but only give birth once, in late summer, 3) the hormonal profiles and white blood cell counts of rattlesnakes vary dramatically throughout the year, showing seasonality in endocrine and immune function. I am excited to continue this research with the help of Cal Poly undergraduates in the Honors Program. If funded by the Honors Program this year, I would be seeking up to two undergraduate honors students to become an integral part of this research program. Students may be from any major, as long as they are interested in learning techniques in ecology and physiology. I currently have one student in the Honors Program, Ben Kwittken, and I would be seeking 1-2 additional students. I would use the Honors Program funding for supplies, travel to and from the field site, and student stipends. As described above, we have determined that male rattlesnakes have larger home ranges than female rattlesnakes. The next step is to examine the hormonal and neurological basis for this sex difference in spatial ecology. In 2009, I plan to manipulate the testosterone levels of free-ranging rattlesnakes to observe whether testosterone is responsible for the large home range size of males. In addition, we will be collaborating with Dr. Christine Strand to examine whether the portions of the brain responsible for spatial navigation (e.g., the medial and distal cortices in snakes) differ between males and females. As an example, we plan to lesion these portions of the brain in free-ranging snakes and follow them using radiotelemerty to document the importance of these brain regions in the snakes' navigational ecology. Students who get involved in this project will be able to choose to conduct either field research (e.g., radiotracking the rattlesnakes on weekends to document their locations and behaviors) or laboratory research (e.g., performing histological techniques on the brains of snakes to quantify sex differences in brain anatomy and physiology), or a combination of the two. In addition to learning skills relevant to ecology and physiology, students will also benefit from being part of a large team examining various aspects of the physiological ecology of reptiles (the laboratory currently houses 3 graduate students and 12 undergraduate student researchers).
Interdisciplinary Nature Description	This project is open to students from any major who are interested in learning techniques in wildlife biology, ecology, physiology, and behavior.
Links	
Number of Honors Students Requested	2
Applicable Majors	BIO, ASCI, CHEM, FNR, EDUC, VS, STAT, PSY
desired_res	My students do not need to have any skills upon joining the lab, as I will teach them many skills in field biology. In addition, any students interested in the neurobiology aspect of this project will learn histological techniques from my collaborator, Dr. Christine Strand.

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