

David L Nieland

Subject: Graduate student openings in mammal ecology and evolution in Canada

I am currently advertising three graduate student openings in my lab in the Department of Biology at the University of Saskatchewan (www.lanelab.ca). I envision two of these as most appropriate for Ph.D. students and one as most appropriate for an M.Sc. student. There is some latitude for broadening or tightening the focus, however, to accommodate alternatives. All will begin in either May or September, 2015. I have full funding for one of the Ph.D. positions. The other two positions will be supported by departmental or university-level teaching assistantships (competition for these funding sources will be in spring 2015).

Graduate student funding at the UofS is quite competitive so, for all positions, the successful applicant will have a GPA >80% (converted to the UofS' 1-100 scale) over the past two years of schooling and a degree in a relevant discipline (i.e., Ecology, Evolutionary Biology, Physiology, Environmental Biology). Of note, while I certainly appreciate the hard work that is put into obtaining a degree in Biotechnology, I do not view this as relevant experience for these positions. The specific interests/experience of the successful candidate will vary to some extent on the project applied for, but in all cases, a passion for fieldwork (in beautiful places), strong scientific communication skills (both written and oral) and statistical proficiency (or a willingness to gain it) is necessary.

If you are interested in applying for one of these positions, please submit a cv (including names and contact details of references), a short (1 pg) description of research interests and an unofficial copy of your transcripts to jeffrey.lane@usask.ca. Applications will be accepted up to Jan 31, 2015, but will be evaluated as they're received. To ensure full consideration of your application, therefore, please submit asap. Any questions can be directed to Jeff Lane (email above).

Hibernation biology of Columbian ground squirrels (Ph.D.):

Columbian ground squirrels are resident in the northwest Rocky Mountains and populations in Kananaskis, Alberta have been studied since the early 1990's.

We have recently shown that, in contrast to the overwhelming majority of reported phenological trends in response to climate change, emergence dates from hibernation in this population have been consistently delayed over the past two decades. This effect is likely due to an increasing prevalence of late-spring snowstorms in the area. This project will involve investigating additional phenological traits (e.g., entry into hibernation), physiological changes during the active (e.g., energy expenditure during reproduction) and hibernation season (e.g., body temperature profiles) and survival and reproductive success of individuals. In all cases, datasets collected over multiple years are available and can be built upon, and multiple completely censused populations are available for study. This is an ideal opportunity for a student to leverage a proven powerful study system to address important fundamental and applied research questions.

Relevant literature:

Lane, J.E., L.E.B. Kruuk, A. Charmantier, J.O. Murie and F.S. Dobson. 2012.

Delayed phenology and reduced fitness associated with climate change in a wild hibernator. *Nature* 489: 554-557.

Lane, J.E., L.E.B. Kruuk, A. Charmantier, J.O. Murie, D.W. Coltman, M.

Buoro, S. Raveh and F.S. Dobson. 2011. A quantitative genetic analysis of hibernation emergence date in a wild population of Columbian ground squirrels. *Journal of Evolutionary Biology* 24: 1949-1959.

Reproductive phenology of North American red squirrels (Ph.D.):

The Kluane Red Squirrel Project (KRSP) was initiated in the late 1980's and now represents one of the longest running and most-comprehensive studies of a wild mammal in the world. Researchers from multiple universities are involved and exciting collaborations have produced many important, interdisciplinary findings. A clear strength of this project stems from our ability to quantify the primary food resource for individual red squirrels (white spruce seed, cached as cones). This project will involve investigation of phenological variation of individual red squirrels and its relationship to phenological variation in white spruce. Quantitative genetics analyses will be used to estimate heritabilities and genetic correlations (i.e., evolutionary potential) in phenological traits and opportunities are available to collaborate with other researchers in energetic physiology, population ecology, endocrinology and animal behaviour. All fieldwork will occur in the spectacular southwest Yukon Territory at KRSP's field camp.

Relevant literature:

Williams, C.T., J.E. Lane, M.M. Humphries, A.G. McAdam and S. Boutin. 2013.

Reproductive phenology of a food-hoarding mast-seed consumer: resource- and density dependent benefits of early breeding in red squirrels. *Oecologia*

174: 777-788.

Boutin, S. and J.E. Lane. 2014. Climate change and mammals: evolutionary versus plastic responses. *Evolutionary Applications* 7: 29-41.

Resource use and population demographics of black tailed prairie dogs (M.Sc.):

In 2014, we initiated a new project in collaboration with Parks Canada and the Calgary Zoo on the ecology of black tailed prairie dogs in southern Saskatchewan. Here, the species reaches its northern range limit, and colonies are only found in and around Grasslands National Park. Black-tailed prairie dogs are a key feature of the prairie ecosystem with numerous species relying on them (black-footed ferrets, burrowing owls and swift fox, to name a few). We have undertaken a complete colony-level census (> 200 individuals caught to date) and aim to maintain this as a long-term individual-based study. It should provide for an ideal opportunity to better understand the limits to species ranges, which, in the context of climate change are becoming increasingly relevant. This project will investigate multi-level habitat selection (at the individual, colony and population level), population viability and threats to population persistence (e.g., climate change, disease, predation). This is a rare opportunity to couple high-level fundamental research questions with direct on-the-ground management applications for this and associated species (most notably the extirpated black-footed ferret, currently the subject of an ambitious reintroduction program).