Illinois Wesleyan
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Question from Jackie S. and Allison, M.:
How can I combine my love of animals and mathematics into a rewarding career?

Response from Dr. Zahia Drici

In my view, the best way to combine your two interests is to study *Applied Mathematics* and specialize in *Mathematical Modeling*. Mathematical Modeling deals with a variety of real-world phenomena and its main goal is to develop mathematical models for them. The purpose of a given mathematical model is to help us better understand a given phenomenon and also predict future values of variables used in describing the phenomenon.

As a professional mathematical modeler, you could choose to specialize in ecology and examine problems related to animal population biology. For example, a great deal of current research is concerned with modeling multi-species and spatial population growth in order to better understand what regulate animal population in the natural environment. You could also specialize in the spread of animal diseases. The so-called "mad cow' disease and the Avian influenza, which decimated Asian poultry flocks and infected several people, are examples of recent animal diseases that need to be better understood.

In my Mathematical Modeling class, students modeled populations of endangered species in order to determine the factors that adversely affect those populations. Examples of endangered species of special interest to my students have been the endangered grizzly bear in the Yellow Stone National Park, the spotted eagle, and the white whale. Other interesting problems are those related to interacting species. An example is the case of the American gray squirrel and the British red squirrel. When the former was first released in England, it faced an indigenous competitor, the red squirrel that occupied the same habitats, ate similar food, and had same foraging habits. Red squirrels fell prey to a disease, possibly transmitted to them by the gray squirrel, which was more prolific than its red cousin and which eventually outnumbered it. This particular problem was studied in order to find an answer to the important question: *what exactly controls the spatial spread of competing species?*

The list of animal-related problems that can be modeled mathematically is almost endless. A good reference on the subject is the book titled *Modelling Biological Populations in Space and Time* by Eric Reinshaw. The mathematics is advanced but the problems described will give you additional examples. Please fill free to contact me at zdrici@iwu.edu if you have any related questions.