

Spring 2020 BPSC 244: Species Distribution Modeling

Instructor: Professor Janet Franklin (Janet.Franklin@ucr.edu) – *please email me any questions or if you would like a more detailed syllabus*

Schedule Numbers: BPSC 65812, 65814 (linked; 4 units)

Where: BH 1104

When: MW 10am-10:50am; + M 11am-11:50pm*

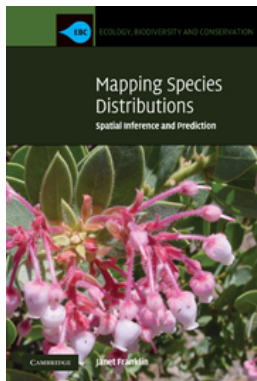
(*Mondays will *probably* be virtual via Zoom because it is easier to demonstrate RStudio sessions and share screens in that mode. Weds is planned for in person for lecture, presentation, discussion)

What we will learn about: Comprehensive introduction to *species distribution modeling* techniques used for predicting species distributions and other biospatial patterns. Also called *niche modeling*, habitat suitability modeling and predictive mapping. Spatial predictions of species distributions or habitat suitability are required for many aspects of environmental research, resource management and conservation planning, including *reserve design* and forecasting *global change impacts* and *invasive species risk*. This course uses a framework for mapping species distributions based on biological survey data, statistical models and geospatial data (digital maps of the environment). The framework includes ecological and biogeographical theories of species niche and species range, data models for species and environmental data, and data analysis and statistical model validation techniques.

What we will do: Lectures and computer exercise demonstrations by Instructor; student lead discussion of recent literature; hands-on experience with methods (computer exercises); student research project (demonstrating competence in methods). Gain experience with modern regression and statistical/machine modeling techniques (Generalized Linear Models, GAMs, Decision Trees, Maxent) using R software (open source) for statistical modeling of species distributions.

How we will do it: During class we will be doing background lectures, and student-lead discussions of readings from the primary literature, and hands-on computer exercise demonstrations. Brief 'lab reports' will be turned in (primarily so that you have your own documentation of things you learned from the exercises). Students will work on an independent, self-paced research project, and present it in class and turn in a report at the end of the quarter.

Recommended Prior Experience: Previous or concurrent coursework in statistics (through multiple regression). Some experience with **R** and GIS is also very helpful.



Textbook and Other Readings and Course Materials:

Franklin, J. (2010) *Mapping species distributions: spatial inference and prediction*, Cambridge University Press, Cambridge, UK.

...and a few chapters from:

Guisan et al. (2016). *Habitat suitability and distributions models*. Cambridge University Press, Cambridge, UK.

Both available digitally in our library. Other readings will include articles from the primary literature, and we will use freely available software & documentation (tutorial, vignettes).

You will need to bring your own laptop to work on.