

EEB 504 - Module I: Species' ranges in GIS
Fall 2017

Instructor: Monica (Mona) Papeş (mpapes@utk.edu; 865-974-2821; office Hesler 443)
Teaching Assistant: Chad Stachowiak (cstacho1@vols.utk.edu)

Class meeting time: 11:10 am - 12:25 pm Tuesday and Thursday, Burchfiel Geography Building 405

Office hours: Please email me to set a meeting time.

Course objectives:

- Get to know ArcGIS (acquire basic skills)
- Learn about GIS data and tools used to study species' geographic ranges
- Think spatially

The materials and activities will prepare the students for Module II (Species' Niche) that will cover theory and practice of ecological niche modeling.

Class format:

Class time will be divided between mini lectures and computer demonstrations and practice. Part of class time will be used by students to develop an individual project, to be completed by the end of Module I.

Grading:

Hands-on activities	20%
Paper summaries	20%
Project report	60%

Most classes will include **hands-on activities**. Students are asked to keep track of their work and *submit on Canvas a summary (bullet points accepted) at the end of class period or end of the day.*

We will have **three paper discussions**. Students are expected to come to class prepared to discuss the paper, thus are *required to submit on Canvas a summary of the paper assigned for in-class discussion*. The summary is due the day before the class discussion is scheduled and should include a few short statements (50-100 words) for each of the following points:

- a. The main goal(s) of the paper
- b. The main conclusion(s) of the paper
- c. Three examples of information presented in the paper that was either new to you or intriguing.
Feel free to agree or disagree with the main findings, methods, etc.

Students will develop a **project** that will make use of skills acquired during class. The project can be as simple as compiling occurrence data for a species of interest, analyze these data in relation to a set of environmental variables, and generate a map. *A brief project outline (maximum 1 page) should be submitted on Canvas by Sept 7. The final project report is due Sept 25.*

Expectations for written project report: concise, maximum 4 pages (excluding references). Include the following sections: Background, Objectives, Workflow (Data and Analyses), Results, Conclusions, References.

Tentative schedule:

Aug 24: What is GIS; types of data (raster; vector)

Aug 29: Species' data: occurrences, ranges – sources

Aug 31: Species data - individual work

- Paper discussion 1

Sept 5: Environmental data: climate, landuse – sources

Sept 7: Environmental data: remote sensing

- Project outline due

Sept 12: ArcToolbox I - overview and exercises

- Paper discussion 2

Sept 14: ArcToolbox II - overview and exercises

Sept 19: Environmental data - individual work

- Paper discussion 3

Sept 21: Project wrap-up

How to access ArcGIS:

1. The classroom (BGB 405) is open when not in use by other courses.
2. Install ArcGIS on your PC: OIT distributes 1-year student/trial version of ArcGIS. Distribution needs to be initiated by each student individually with OIT.
3. APPS@utk (<http://oit.utk.edu/labs/app/>): after logging in with your NetID, open the folder named "Graphix". ArcGIS products are located in this folder.
Store your data files on your UTK network (your "H" drive). This will allow you to access your project from anywhere. If your data files are in your "home" directory on the network, there is no latency opening up a project from a classroom machine or your personal machine.

The Commons at Hodges Library has about 100 Windows-based computers. Access ArcGIS via Apps@UT.

EEB 504 - Module II: Species' niches
Fall 2017

Instructor: Monica (Mona) Papeş (mpapes@utk.edu; 865-974-2821; office Hesler 443)
Teaching Assistant: Chad Stachowiak (cstacho1@vols.utk.edu)

Class meeting time: 11:10 am - 12:25 pm Tuesday and Thursday, Burchfiel Geography Building 405

Office hours: Please email Mona or Chad to set a meeting time.

Recommended books:

Peterson, A.T. et al. 2011. Ecological Niches and Geographic Distributions. Princeton University Press.
Franklin, J. 2010. Mapping Species Distributions: Spatial Inference and Prediction. Cambridge University Press.

Course objectives: Ecological niche modeling (ENM) is used to investigate species' geographic distributions and has generated much interest in recent years. Students will learn how to obtain niche models and distribution predictions using a presence-background algorithm (Maxent) and will use the model outputs to address questions related to species' ecology, conservation, and biogeography.

Class format: Most class time will be divided between mini-lectures and computer demonstrations and practice. Students are expected to develop and work on an individual project during class and present project results at the end of the module.

Grading:

Paper summaries	15%
Group presentation	20%
List of datasets for niche modeling	15%
Project powerpoint slides	10 %
Project report	40%

We will have **three paper discussions**. Students are expected to come to class prepared to discuss the paper, thus are *required to submit on Canvas a summary of the paper assigned for in-class discussion*. The summary is *due the day before the class discussion* is scheduled and should include a few short statements (50-100 words) for each of the following points:

- The main goal(s) of the paper
- The main conclusion(s) of the paper
- Three examples of information presented in the paper that was either new to you or intriguing.
Feel free to agree or disagree with the main findings, methods, etc.

In addition to weekly paper discussions, students will be asked to review three papers with niche modeling applications that interest them and provide a brief **group presentation in class on Oct. 19**.

Students will develop a project that will illustrate the use of ecological niche modeling to answer a question of interest to them. A **list of datasets** (number of species' localities and sources; environmental variables with spatial resolution, temporal information and sources) to be used to generate the niche models is *due Oct. 12* (Canvas submission). Students will summarize their project in a **project powerpoint** file (maximum 15 sides) that will be shared on Canvas by *Oct 29*. A written **project report** will be *due Nov 3* (Canvas submission).

Tentative schedule:

Sept 26: Species' distributions and ecological niches – Concepts

Sept 28: From niches to species' distributions in practice

Oct 3: Evaluation of niche models; From niches to distributions – Applications

- Paper discussion

Oct 5: Fall break

Oct 10: Ecological niche modeling algorithms: Maxent

- Paper discussion

Oct 12: Maxent demo

List of datasets due

Oct 17: Review of ENM applications (group presentations)

Oct 19: Evaluation and postprocessing of ENM predictions; ENMTools (niche similarity tests)

Oct 24: Project development

- Paper discussion

Oct 26: Project wrap-up

Oct 31: Discussion of projects