Using Digitized Herbarium Data in Research: Applications for Exploration, Taxonomy, and Ecology
BOTANY 2025 - July 27, 2025

TIME	TOPIC	LEARNING OBJECTIVE(S)	INSTRUCTOR(S)
9:00 - 9:20 (20 min)	Welcome + Overview (including Data Standards + Data Fields)	- Navigate the iDigBio portal to locate and filter biodiversity occurrence data relevant to specific research questions. - Download and interpret occurrence data from iDigBio, with attention to key Darwin Core fields. - Presentations 01-03	Pam Soltis
9:20 - 9:30 (10 min)	*Activity: Participants use the iDigBio Portal*		
9:30-9:35	Introduction to HiPerGator	- Introduction to navigating the workshop on HiPerGator.	Makenzie Mabry
9:35 - 9:45 (15 min)	Data Downloads	- File organization and access - Use the R package gatoRs to programmatically query and download occurrence data from iDigBio, applying filters for taxon name, geography, and date range. - Presentation 04	Shelly Gaynor
9:45- 10:00 (15 min)	*Activity: Data Downloads*		
10:00 - 10:30	Coffee Break		
10:30 - 10:45 (15 min)	Data Cleaning	- Apply the gators R package to clean and standardize iDigBio occurrence data, including filtering records by coordinate validity, date completeness, and taxonomic resolution. - Presentation 05	Shelly Gaynor
10:45 - 11:00 (15 min)	*Activity: Data Cleaning*		
11:00 - 11:30 (30 min)	Georeferencing	- Interpret and manipulate spatial data associated with biodiversity records, including evaluating coordinate accuracy and georeferencing locality descriptions using standardized methods. - Presentation 06	Sarah Ellen Strickland
11:30 - 11:45 (15 min)	Environmental Variables + Data Exploration	- Identify and obtain relevant climatic and environmental datasets. - Extract environmental variable values at species occurrence locations using spatial data tools in R. - Explore environmental differentiation among species or populations based on occurrence-linked climatic variables.	Sydney Barfus
11:45 - 12:15 (30 min)	*Activity: Environmental Variables + Data Exploration*		

		- Presentation 07	
12:15 - 1:15	Lunch		
1:15 - 1:25 (10 min)	Defining Accessible Area + Variable Selection	- Define and justify the accessible area (M) for species. - Select and justify environmental variables for niche modeling by assessing multicollinearity. - Presentation 08	Makenzie Mabry
1:25-1:45 (20 min)	*Activity: Defining Accessible Area + Variable Selection*		
1:45 - 2:00 (15 min)	Ecological Niche Models (ENMs)	- Explain the benefits of using the ENMeval R package for ecological niche modeling, including its capacity to automate model tuning, evaluate multiple combinations of model settings, and assess model performance using cross-validation. - Presentation 09	Sebastian Fernandez
2:00 -2:30 (30 min)	*Activity: ENMs*		
2:30 - 2:40 (10 min)	Null ENMs + Understanding ENM output + How to choose the best model	- Apply null model tests to assess whether ecological niche models perform significantly better than expected by chance. - Assess and compare ecological niche models using validation metrics. - Presentations10	Tyler Radtke
2:40 - 3:00 (20 min)	*Activity: Null ENMs + Understanding ENM output + How to choose the best model*		
3:00 - 3:30	Coffee Break		
3:30 - 3:45 (15 min)	Post ENM analyses + Future Predictions	- Project ecological niche models onto future environmental scenarios to predict potential shifts in species habitat suitability under climate change. - Perform post-modeling analyses such as binary map creation, niche overlap quantification, and change detection to evaluate species' responses to environmental change. - Presentation 11	Elizabeth White
3:45 - 4:15 (30 min)	*Activity: Post ENM analyses + Future Predictions*		

4:15 - 4:35 (20 min)	Occupancy models	- Explain the purpose of occupancy models in ecological research, particularly their role in accounting for imperfect detection in species occurrence data. - Presentation 12	JT Miller
4:35 - 4:50 (15 min)	Closing with Examples	- Describe examples of research projects using digitized herbarium data, illustrating the breadth of applications. - Presentation 13	Doug Soltis
4:50 - 5:00	Final Q & A		all

Links:

- HTML view of the code: https://soltislab.github.io/BotanyENMWorkshops/Botany2025/Botany2025.html
- GitHub repository: https://github.com/soltislab/BotanyENMWorkshops
    - All PowerPoint/presentations will be uploaded here following the workshop.