

Geography 323: Biogeography, Winter 2019 (CRN 27137)

Instructor: Erin Herring

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Office: 245 Columbia; Lab: 217 Pacific Hall

Office Hours: Wednesdays 10:00-11:00 and Thursdays 9:00-10:00 or by appointment in Columbia 245.

Lecture: 8:30 – 9:50 am Monday and Wednesdays in 128 Chiles (CHI)

GTFs and Weekly Lab Sections:

Chantel Saban: Tuesdays 2:00-3:00 and Tuesdays 3:00-4:00 in Condon 106

Office: Condon Pacific 217A

Email: csaban@uoregon.edu

Office hours: Mondays 11-12

Schylar Reis: Fridays 10:00- 11:00 and Fridays 11: 00-12:00 in Condon 106

Office: Condon Pacific 217A

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Office hours: Tuesdays 1-2 pm



Course Overview: The spatial patterns of species distributions are widely recognized, but few appreciate the complex causes of these patterns. Biogeography is the study of the spatial patterns of biological diversity, and its causes, both in the present and in the past. Biogeographers synthesize information from a very broad range of fields, including ecology, evolution, paleontology, and climatology. This course will provide the ecological and historical foundations for understanding the distribution and abundance of species, and the changes in distribution and abundance over time. We will also explore the relevance of biogeography during a time of increasing human impact and climate change.

Prerequisite: GEOG 141, GEOL 103, GEOL 203 or BI 370.

The course begins with an overview of important concepts, including evolutionary mechanisms, earth history, and plate tectonics, as well as concepts of the ecological niche and patterns of distribution at various taxonomic levels. We also study basic ecological concepts, how species are patterned and disperse on the landscape, and how these patterns have changed over the relatively recent ice ages. In the second part of the course, we delve into historical biogeography and study why continents and islands have unique assemblages of species, and the effects of megaextinctions and biotic interchanges between continents. We also return to ecological concepts in a detailed examination of the equilibrium theory of island biogeography. The following diagram illustrates the organization of topics to be covered, with the emphasis on how this information is used to understand current biodiversity and what threatens it.

Goals of the course:

- To develop an appreciation for the historical and ecological factors that influence the pattern of life on earth.
- To survey the scientific revolutions of evolution, plate tectonics, and molecular ecology that shaped the path to modern biogeography.
- Using the lab assignments, to apply the information covered in lecture to a real world scenario.
- To understand the processes that affect how biotas respond to a changing climate, and the challenges we face today and in years to come.

Course grading:

- Two exams, each covering approx. half of the course and each worth **15%** of your total grade
- Weekly online discussions – **10%**
- In class participation (both lecture and lab) – **5%**
- Five labs for a total of **55%** of your grade. All labs should be typed and submitted on Canvas on their assigned due dates. Weighting of the grades will increase with expectations and complexity of the lab:
 - Lab 1: Trees adaptations across the continents – **10%**
 - Lab 2: Virtual Megatransect – **15%**
 - Lab 3: Spatial patterns of individuals – **15%**
 - Lab 4: Island biogeography – **10%**
 - Lab 5: Invasive species – **5%**. Note: Lab 5 will be graded as credit/no credit: ALL questions must be answered to get credit!

Required readings:

- All readings will be supplied online through Canvas (canvas.uoregon.edu).
 - You may wish to purchase the following book (no longer in print) if you can get a copy through Amazon or another seller: Here Be Dragons, by Dennis McCarthy. Oxford University Press. This book is no longer in print, but I suggest finding a used copy via Amazon or some other source. There is a kindle edition available from Amazon for \$9.99.
- All labs and any additional materials will be posted on Canvas as modules for each week.

*****No makeup exams will be offered unless you arrange this with me in advance. No makeups will be offered for in-class activities or labs. Labs will be assessed a 10% per day penalty if they are late.*****

The "small print": During lecture please be respectful of everyone's learning experience. This includes:

1. No talking amongst each other. Please leave your social conversations for outside the classroom. However, questions during lectures are encouraged. If you have a question, raise your hand, catch me after class, or post to our online discussion board.
2. Please don't leave in the middle of lecture. It is distracting for many people, including me. If you need to leave, then let me know before the lecture starts, then sit near an exit.
3. Do not have your laptop open to surf the web. Notetaking on laptops or on mobile devices (such as an iPad) is fine.
4. Cheating. Cheating, such as copying material from other students on tests, will result in failing the test at a minimum and I will pass the information on to the Dean of Students. In serious cases, you will flunk the class or be expelled from the university.

5. Plagiarizing. Plagiarizing occurs when you copy materials from other sources without citing the source (i.e., taking credit for someone else's work), or copy someone else's lab. All students should be familiar with the material in this guide on avoiding plagiarism (<http://researchguides.uoregon.edu/citing-plagiarism/plagiarism>).

Academic Misconduct: The University Student Conduct Code (available at conduct.uoregon.edu) defines academic misconduct. Students are prohibited from committing or attempting to commit any act that constitutes academic misconduct. By way of example, students should not give or receive (or attempt to give or receive) unauthorized help on assignments or examinations without express permission from the instructor. Students should properly acknowledge and document all sources of information (e.g. quotations, paraphrases, ideas) and use only the sources and resources authorized by the instructor. If there is any question about whether an act constitutes academic misconduct, it is the students' obligation to clarify the question with the instructor before committing or attempting to commit the act. Additional information about a common form of academic misconduct, plagiarism, is available at researchguides.uoregon.edu/citing-plagiarism.

Disability Services Notice: I work hard to ensure a quality learning experience for all students. If you need specific accommodations to get the most out of this class, please let me know by (1) informing me of your particular needs, and (2) providing the appropriate documentation from the campus learning services office. I will make every effort to accommodate your needs, but you must notify me by the first week of class if you need special arrangements.

Note: I consider this syllabus a contract between myself and the students in this course. In writing this syllabus, I have obligated myself to follow the policies and procedures contained herein. You are responsible for understanding and following these policies as well. I reserve the right to make changes to this syllabus. You will receive verbal and written notification of major changes to course policies, procedures and content.

Link to other useful resources for topics in Biogeography:

- http://geog.uoregon.edu/gavin/courses/Geog323/Geog323_links.html
- Plus our Canvas Page!

Class Schedule

Week	Date	Topic	Required Readings
1	Jan 7	Introduction and history of biogeography	McCarthy Chapter 1 MacDonald Pages 1-16
	Jan 9	Evolution and plate tectonics	McCarthy Chapter 2 MacDonald Chapter 9 Evolution 101 web pages
	<i>Lab 1</i>	<i>Trees: Adaptations Across the Continents – Day 1</i>	
2	Jan 14	Introduction to dispersal: Excerpt from Darwin's 'Origin of Species'	Darwin Ch. 12 ("means of dispersal") McCarthy Chapter 3
	Jan 16	Ecological niche and distributions of species	Gavin Lomolino et al. 83-114 Pielou Chapter 13
	<i>Lab 1</i>	<i>Trees: Adaptations Across the Continents – Day 2</i>	

3	Jan 21	NO CLASS Martin Luther King Holiday	
	Jan 23	Ecoregions and biomes	TBD
	<i>Lab 2</i>	<i>Virtual Megatransect – Day 1</i>	
4	Jan 28	Dispersal syndromes, barriers, and limits to distributions	Molles pp. 197-203 Lomolino et al. 167-204
	Jan 30	Patterns of biodiversity: local gradients to global hotspots	Perry Chapter 10
	<i>Lab 2</i>	<i>Virtual Megatransect – Day 2</i>	
5	Feb 4	EXAM 1	*Covers lectures for weeks 1-4, Labs 1 & 2, and all readings
	Feb 6	Pleistocene climate, Pleistocene biogeography, and paleoecology	Jackson Quaternary Biogeography
	<i>Lab 3</i>	<i>Spatial patterns of individuals – data collection</i>	
6	Feb 11	The Pleistocene continued	
	Feb 13	Vicariance biogeography, mammals, and paleontology	Zimmer and Emian
	<i>Lab 3</i>	<i>Spatial patterns of individuals – data analysis</i>	
7	Feb 18	Life, death, and evolution on islands	Cox et al. Chapter 7
	Feb 20	The Theory of Island Biogeography	MacDonald 428-444 Website: I.B. explained
	<i>Lab 4</i>	<i>Island biogeography Day 1 – data collection</i>	
8	Feb 25	Island Biogeography: General Dynamic Model, Nestedness, SLOSS	Cox et al. Chapter 7 Website: Olivia Judson (NY Times)
	Feb 27	Phylogenetics, vicariance biogeography, and Nothofagus	Cox et al. Chapter 8
	<i>Lab 4</i>	<i>Island biogeography Day 2 – data analysis</i>	
9	March 4	Case studies in historical biogeography	
	March 6	The Great American Interchange and Amazon biodiversity	McCarthy Chapter 5
	<i>Lab 5</i>	<i>Invasive Species – watch the movie “The Silent Invasion”</i>	
10	March 11	Advent of Humanity and Pleistocene Megafauna Extinctions	Flannery 186-217 Barnosky McCarthy Chapter 7 (Advent of humanity)
	March 13	Conservation Biogeography, Mega-extinctions and Climate Change	Cox et al. Chapter 14 (first 36 pages) Online only: Jablonski McCarthy Chapter 8 (just skim)
	<i>Lab 5</i>	<i>Invasive Species in-class reports</i>	
FINALS WEEK	March 21 10:15	Final Exam - 10:15 Thursday, March 21	Covers all materials presented since the midterm