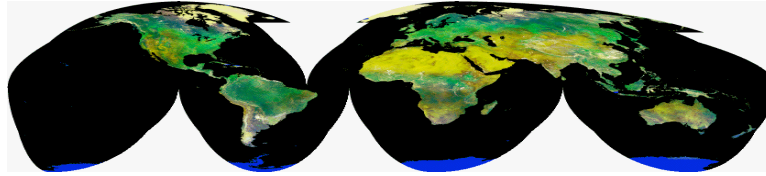


**Biogeography**  
**Course Outline — Spring 2014**

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11.00 – 11.50 MWF • 112 Transportation Building

**Course description**

Biogeography deals with spatial and temporal patterns of biological diversity and the factors that govern the distribution and abundance of taxa. This course will address two of its subfields: historical biogeography – the origin, dispersal, and extinction of taxa and biotas; and ecological biogeography – the role physical and biotic environments play in determining taxonomic distributions. We will explore the ecological, evolutionary, climatological, and paleontological foundations for the distribution of species and biological communities. The course will review many of the field's classic papers, the current synthesis of biogeographic theory, and the application of biogeography to conservation.

**Course goals**

By the end of the semester, you will be able to:

- Describe the historical and ecological factors which influence the pattern of life on earth
- Apply the scientific method and philosophy of hypothesis testing to biogeographic problems
- Explain how advances in paleontology, climatology, evolution, plate tectonics, molecular systematics, and ecology have shaped the modern synthesis of biogeography
- Evaluate modern conservation and mitigation strategies using biogeographic theory
- Analyze and interpret scientific literature, through writing and class discussion

**Prerequisites**

This course is intended for upper classmen and graduate students with a background in biology and ecology. Enrollment is recommended only for students who have taken IB 150 (Organismal & Evolutionary Biology) or have completed equivalent coursework. If you have not taken IB 150, please speak to the instructor before enrolling in this course.

**Instructors**

Dr. Surangi W. Punyasena, Assistant Professor, Plant Biology

Office hour: Fridays 1.00 - 2.00, Morrill Hall 139 (email to confirm)

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## **Textbooks**

### *Biogeography, Fourth Edition*

MV Lomolino, BR Riddle, RJ Whittaker, and JH Brown  
Sinauer Associates; 4th edition (2010)  
ISBN 978-0-87893-494-2

### *Foundations of Biogeography: Classic Papers with Commentaries*

MV Lomolino, DF Sax, and JH Brown (editors)  
University Of Chicago Press; 1st edition (July 1, 2004)  
ISBN 0-22649-237-0

Textbooks are available for purchase at the university bookstore and will be on reserve at the Grainger Engineering Library. Additional reading is available as E-reserves under the course rubric (<https://reserves.library.illinois.edu/ares/>).

## **Course Website**

You should have access to the class Moodle account if enrolled in this course: <https://moodle.life.illinois.edu/> [<https://moodle.life.illinois.edu/course/view.php?id=439>]. The site will contain course announcements, links to the reading, and links for uploading assignments.

## **Grading**

There are four grading criteria: in-class activities, exams, weekly discussions with written assignments, and a term paper with prospectus, draft, and peer review Regular attendance is expected, as the success of this class depends on the full participation of every student. *Students with excessive unexcused absences may lose up to one letter grade from their final grade.*

### **In-class assignments and participation (10%)**

Short in-class written assignments will be part of the lecture, and will be graded on a credit/no credit basis. Regular participation in lecture and discussion will informally count toward your final grade.

### **Exams (30%)**

There will be an in-class midterm (03/17/14) and scheduled final (05/16/14), each worth 15% of your final grade. The final is cumulative and will cover the entire semester's material. Exams are closed book and closed notes, though essay questions will be distributed beforehand. All questions will be short answer or essay.

### **Friday Discussions (35%)**

Small group discussions of assigned reading will be held on Fridays. Each group member will be responsible for turning in a one-page weekly response. One student will be responsible for preparing discussion questions on the reading each week and leading the discussion. This responsibility will rotate among group members. Participation will be graded through peer evaluations. Please see the section on "Friday discussions" for more information on grading and logistics.

### **Term paper (25%)**

The term paper is a 5-page research proposal on a biogeographic topic. There are three components: a prospectus (due 2/17/14); peer review of drafts (3/31/14); and the final paper (due 5/2/14). Please refer to the handout for the term paper assignment for more information.

## **Friday Discussions**

Given the pace of scientific advancement, there are few opportunities to read and discuss the seminal works that shaped the biogeographic revolution. While the lectures on Monday and Wednesday serve as introductions to fundamental concepts in biogeography, the Friday discussions are designed to introduce you to the original papers that defined the discipline and the more recent literature stemming from this work.

*Foundations of Biogeography* is an annotated collection of these seminal works. I have chosen a small selection of papers that broadly relate to the topics covered by this course. Our discussion will focus on the papers, but the introductions to each chapter will provide the background you need to place the assigned papers in a historical and disciplinary context, and will help you with your written responses.

By the end of the semester, you will:

- Have read a broad cross-section of the biogeographic literature
- Be able to describe several key papers that shaped the field
- Be able to interpret and critique the primary scientific literature
- Have had experience independently leading a group discussion

## **Instructions**

The class will be divided into ~15 groups of 4-5 individuals. Groups will be reassigned every 4 weeks.

For the first 25 minutes of class, you will discuss the assigned reading within your group. In the final 20-25 minutes of class, each group will be asked to present a summary of their discussion. The responsibility of leading the small group discussion will rotate among the group members each week.

The week's leader is responsible for preparing 4 or more questions on the reading to start the discussion. A copy of these questions should be uploaded to Moodle before the beginning of class. (Please cut and paste your questions or upload a PDF). All members of the group will turn in a short weekly response (one page). The response must include an original observation or question that demonstrates that you have read and understood the paper. This should also be uploaded to Moodle before class. (Please cut and paste your response or upload a PDF). I recommend printing a hard copy for your own use during the class discussion.

The final component of your discussion grade is peer evaluations of your participation effort. You will be evaluated on a 10-point scale. There will be ~4 evaluations, each time groups are reassigned.

## **Grading Rubrics**

### Discussion questions (out of 10 points, 15% of final grade)

+4 points	List at least four questions based on the assigned reading
+4 points	Questions are phrased to initiate discussion
+2 points	Questions demonstrate a deep and focused reading of the material
Grade = 0	One copy of the questions is not uploaded to Moodle before class
Grade = 0	Absence from the discussion on your assigned date
-5 points	Arriving more than five minutes late to class on your assigned date

Weekly response (out of 10 points, 15% of final grade)

+3 points	Response demonstrates a focused reading of the material
+3 points	Response demonstrates an understanding of at least one major concept covered by the material
+2 points	Response makes connections to the topics discussed in lecture
+2 points	Response is grammatically correct and cogent
Grade = 0	One copy of the response not turned uploaded to Moodle before class

Peer evaluation/participation (out of 10 points, 5% of final grade)

+5 points	Regular participation (contributes more than twice to the discussion)
+3 points	Quality of the discussion questions (whether questions initiated a thoughtful discussion, raised new insights)
+2 points	Quality of participation (thoughtfulness of comments, helpfulness of comments toward overall understanding of the group)
-2 points	Deduction for any unexcused absence from Friday discussion

**Course Policies**

All students are assumed to have read and understood the “Code of Policies and Regulations Applying to All Students,” University of Illinois, and will be expected to act accordingly. The Code is available online at: <http://www.admin.uiuc.edu/policy/code/index.html>. Extended absences require a note from the Office of the Dean of Students (for undergraduates) or written explanation (for graduate students). Dean’s notes are also required to receive credit for missed or late assignments.

**Disabilities and Religious Observances**

Please make any requests for accommodations for disabilities or religious holidays within the first two weeks of class.

## Lecture schedule and reading

Changes to the syllabus and class schedule will be announced in Moodle

Week 1	01/22/14	W	Lecture 01	What is biogeography?	Biogeography, Chapter 1
	01/24/14	F	<i>Discussion</i>	<i>Thinking biogeographically, then and now</i>	<i>Wiens and Donoghue (2004) Foundations (Paper 3 – Forster)</i>
Week 2	01/27/14		Lecture 02	History of biogeography	Biogeography, Chapter 2
	01/29/14		Lecture 03	The geographic template	Biogeography, Chapter 3
	01/31/14		<i>Discussion</i>	<i>Biogeography informs evolutionary theory</i>	<i>Foundations (Paper 11 - Darwin; Paper 12 - Wallace)</i>
Week 3	02/03/14	M	Lecture 04	Distributions of species	Biogeography, Chapter 4
	02/05/14	W	Lecture 05	Distributions of communities	Biogeography, Chapter 5
	02/07/14	F	<i>Discussion</i>	<i>The niche</i>	<i>Jackson and Overpeck (2000) Wiens et al. (2010)</i>
Week 4	02/10/14	M	Lecture 06	Dispersal and immigration	Biogeography, Chapter 6
	02/12/14	W	Lecture 07	Speciation and extinction, I	Biogeography, Chapter 7
	02/14/14	F	<i>Discussion</i>	<i>Accident and invasion</i>	<i>Foundations (Paper 27 - Grinnell) Sax et al. (2007)</i>
Week 5	02/17/14	M	Lecture 08	Speciation and extinction, II <b>PAPER PROSPECTUS DUE</b>	Biogeography, Chapter 7
	02/19/14	W	Lecture 09	Earth history, I	Biogeography, Chapter 8
	02/21/14	F	<i>Discussion</i>	<i>Paleo records of diversification</i>	<i>Foundations (Paper 49 – Raup) Crampton (2011) Hannisdal and Peters (2011)</i>
Week 6	02/24/14	M	Lecture 10	Earth history II	Biogeography, Chapter 8
	02/26/14	W	Lecture 11	Pleistocene glaciations	Biogeography, Chapter 9
	02/28/14	F	<i>Discussion</i>	<i>Distributions and a changing climate</i>	<i>Davis and Shaw (2001) This Week in Science (2011) Chen et al. (2011) [Science]</i>
Week 7	03/03/14	M	Lecture 12	Geography of diversification, I	Biogeography, Chapter 10
	03/05/14	W	Lecture 13	Geography of diversification, II	
	03/07/14	F	<i>Discussion</i>	<i>Evolution of marine invertebrate diversity</i>	<i>Foundations (Paper 48 – Valentine) Jablonski et al. (2013)</i>
Week 8	03/10/14	M	Lecture 14	Phylogeography, I	Biogeography, Chapter 11
	03/12/14	W	Lecture 15	Phylogeography, II	
	03/14/14	F	<i>Discussion</i>	<b>MIDTERM REVIEW – ALTERNATE ROOM – TBA</b>	
Week 9	03/17/14	M		<b>MIDTERM (Chapters 1-11; Lectures 1-15) [in-class]</b>	
	03/19/14	W	Lecture 16	Guest Lecture: Ripan Mahli, Anthropology	
	03/21/14	F	<i>Discussion</i>	<i>Phylogenetics and phylogeography</i>	<i>Foundations (Paper 37 – Hennig) Boussau and Daubin (2009)</i>
Week 10	Spring Break				
Week 11	03/31/14	M	Lecture 17	<b>PEER REVIEW OF TERM PAPER Draft of term paper due</b>	
	04/02/14	W	Lecture 18	Historical biogeography, I	Biogeography, Chapter 12
		F	<i>Discussion</i>	<i>Endemism, vicariance, and conservation</i>	<i>Foundations (Paper 38 – Nelson) Moritz (2002)</i>

Week 12	04/07/14	M	Lecture 19	Historical biogeography, II	Biogeography, Chapter 12
	04/09/14	W	Lecture 20	Historical biogeography, III	
	04/11/14	F	<i>Discussion</i>	<i>History, environment, and community assembly</i>	<i>Foundations (Paper 63 – Whittaker: Sections I, II, IV) Leibold et al (2010)</i>
Week 13	04/14/14	M	Lecture 21	Island biogeography, I	Biogeography, Chapters 13, 14
	04/16/14	W	Lecture 22	Island biogeography, II	
	04/18/14	F	<i>Discussion</i>	<i>Island biogeography and biodiversity dynamics</i>	<i>Foundations (Paper 54 - MacArthur and Wilson) Jackson and Sax (2010)</i>
Week 14	04/21/14	M	Lecture 23	Island biogeography, III	Biogeography, Chapters 13, 14
	04/23/14	W	Lecture 24	Island biogeography, IV	
	04/25/14	F	<i>Discussion</i>	<i>Are mountain passes are higher in the tropics?</i>	<i>Foundations (Paper 32 - Janzen) Deutsch et al. (2008)</i>
Week 15	04/28/14	M	Lecture 25	Continental biotas	Biogeography, Chapter 15
	04/30/14	W	Lecture 26	Continental biotas	
	05/02/14	F	<i>Discussion</i>	<i>Biogeography in ecology and conservation</i>	<i>Whittaker et al. (2005) Ricklefs and Jenkins (2011)</i>
Week 16	05/02/14	M	Lecture 27	Guest Lecture: Brian Allan, Entomology <b>TERM PAPER DUE</b>	
	05/07/14	W	Lecture 28	Beyond biogeography	Biogeography, Chapters 16, 17
Exam week	<b>05/16/14</b>	<b>F</b>	<b>FINAL EXAM 8:00 AM – 11:00 AM Location TBA</b>		