QUANTITATIVE METHODS IN QUATERNARY PALEOECOLOGY (QMQP)
GEOGRAPHY 920 GRADUATE SEMINAR
UNIVERSITY OF WISCONSIN-MADISON
FALL 2018

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When and Where: Friday, noon-2pm, Science Hall 350

INTRODUCTION

The Quaternary (the last 2.4 million years) offers a natural laboratory for studying the responses of plant species and ecosystems to large-scale climatic and environmental change. These climatic oscillations occurred frequently and often abruptly, and at glacial-interglacial timescales are closely linked to large swings in atmospheric CO_2. Humans dispersed across the world over the last 100,000 years, and, not coincidentally, many species, large vertebrates in particular, went extinct. In response to these environmental changes, the abundances and distributions of plant species changed dramatically during the Quaternary, and communities dissolved and reformed over time, often into novel mixtures with no modern analog. We can use the Quaternary to better understand the mechanisms driving ecological responses to past environmental change and to test and refine our models of species responses to environmental change, past and future.

The primary goal of this 2-credit graduate seminar is to give you both hands-on practice and a foundational understanding of the data resources, computational workflows, and statistical methods commonly used in large-scale quantitative analyses of Quaternary paleoecological data. We want you to be able to use these resources, to think of creative new research directions, and think critically about them.

In past years, this course has been taught as a 3-credit 500-level course that combines both hands-on computer labs and discussions of the primary literature. This year, however, we I are teaching just the computer labs as a graduate seminar so that we can try out and develop new content integrate all lab-related materials into a GitHub/R environment. This means that lab materials will be hot off the presses and incorporate, to the best of our ability, the latest methods in Quaternary Paleoecology. It also means that some materials may be a bit rough around the edges as we try things out and work under tight deadlines! We look forward to teaching and learning with you, and appreciate your patience if (when) we hit any rough patches.

For those taking the graduate seminar for 3 credits, additional goals are to give you a grounding in the primary scientific literature and sharpen your critical-thinking and writing skills. We'll draw readings from both classic papers and recent advances.

COURSE MECHANICS

We will center all activities on our weekly two-hour classes on Friday, which we will use both to give overviews of fundamental methods and concepts in Quaternary Paleoecology and as hands-on computer labs. Each class usually will have some set of readings or other preparatory activities that *must* be done prior to class and some set of activities to be during or after class. These activities will be due by the start of the next class. This course follows the standard expectation that for each credit hour, at least two hours are spent outside the classroom working on class-related activities.

Plan to always bring a laptop to class. If you do not have a laptop, please let us know and we will work out an alternative solution.

GRADING
Lab Exercises   80%
Discussion & Participation   20%

CREDITS: 2 credits, with a 3-credit option available.

PREREQUISITES: Open to graduate students and advanced undergraduates, by permission of instructor. Although no formal course prerequisites are set, a familiarity with basic principles in ecology and physical geography is assumed. Useful prior courses include Geography 335 (Climatic Environments of the Past) and 338 (Biogeography). Prior coursework in univariate statistics and an at least an initial familiarity with R is assumed.

ON-LINE MATERIALS: We will use a couple of different platforms to post and share materials:
LearnUW (https://learnuw.wisc.edu/): The course homepage, with links to other online resources.
GitHub (https://github.com/WilliamsPaleoLab/Geography523):
Readings: Posted to WiscBox
(https://uwmadison.box.com/s/6gv01f8tfuki173oxqk9z57mytcf2lwq) with separate folders for the primary readings and the readings for the 3-credit option.

ADDITIONAL RESOURCES
- McBurney Disability Resource Center. Provides services for an inclusive and accessible education. If you need accommodations, please talk to one of the instructors early in the semester or as soon as possible so we can plan to help you. http://www.mcburney.wisc.edu/
- Multicultural Student Center. Provides resources, advocacy and community particularly for students of color and historically underrepresented and underserved students on campus. https://msc.wisc.edu
- CALS Statistics Consulting Lab. Primarily serves students, staff, and faculty in CALS (College of Agricultural and Life Sciences) but can provide assistance to graduate students from other departments. https://www.stat.wisc.edu/consulting-lab
- UW Writing Center. Provides drop-in or scheduled appointments for help. They will help with just about any type of writing assignments/needs. http://www.writing.wisc.edu/