

**GEORGE MASON UNIVERSITY
COLLEGE OF SCIENCE
BIOLOGY DEPARTMENT SEMINAR
Fall 2014**

**Santiago A. Ramírez Barahona, Ph.D.
Institute of Ecology
National Autonomous University of Mexico**

***“NEOTROPICAL FERN DIVERSITY: DEMOGRAPHIC HISTORY AND NICHE
DIVERGENCE IN TREE FERNS (CYATHEACEAE)”***

One of the main goals of evolutionary biology is to explain differences in species richness across regions. Tropical mountains, specially in the Neotropics, have an enormous wealth of plant species, with more than 45,000 species reported for the Andes alone. However, the causes of this great diversification are not well understood. Most studies on Neotropical species have searched for a general mechanism to explain species diversity, such as geological events during the Miocene and Pleistocene glacial cycles. However, the opportunities for allopatric divergence appear to have been affected by important biological factors, such as dispersal ability and niche conservatism. Here we show two complimentary approaches to understanding the causes of Neotropical diversification, using tree ferns (Cyatheaaceae) as a study group. Little is known about the drivers of speciation in ferns and even less is known about the demographic dynamics of ferns in response to climate change. As a first approach, we used distribution modeling to predict the historical distribution of cloud forests during the last 130 kyr, and observed that these changes explain the spatial patterns of genetic diversity and demographic history of the tree fern *Alsophila firma* (Cyatheaaceae). As a second approach, we analyzed the climatic niche of 171 species of Neotropical tree ferns using distribution modeling. This analysis supports the idea that, as in many groups of plants and animals, altitude is one the most important gradients explaining niche differentiation among species. Neotropical tree ferns can be considered a mid-elevation group, with species diversification associated to niche divergence into high- and low-altitude environments. Overall, these two complementary approaches support climatic fluctuations and colonization of new environments as major factors leading to differentiation in this group of plants.

**TUESDAY November 18, 2014
1:00-2:15 PM
Exploratory Hall Room 3301**