



**Department of Mathematics, Statistics and Computer
Science**

St. Francis Xavier University

Presents

Relative Abundance

by

Dr. Thomas L. Vincent

University of Arizona

Dr. Tania L. S. Vincent

Alaska Pacific University

Monday, September 24th, 2007 @ 2:15pm in EG21

Two components of ecological diversity are species richness (number of species) and species evenness (relative abundance). Here we consider the first component to be given within a narrow range in order to focus on the second. Plots from field data of abundance versus rank of trophically similar species show consistent patterns. We use the G-function approach with modified versions of a well known model for coexistence to examine these patterns and explore conditions that can change relative abundance distributions. The G-function approach allows us to define "trophically similar" species as evolutionarily identical individuals that are governed by a single G-function. We assume that the ecosystem is at or near an evolutionary equilibrium and seek to find evolutionarily stable strategies (ESS) used to identify a group of individual species that can coexist together. Such a group is called an ESS coalition. In these terms, relative abundance refers to the ranking, by number of individuals, of each species belonging to the ESS coalition. The models used provide a vehicle for understanding and explaining field data results as well as the conditions that determine the ecological diversity and relative abundance in communities that are in an evolutionarily stable state. Suggested experiments for verification are also provided.

Refreshments will be served before the talk in AX24A