

# Department of Mathematics, Statistics and Computer Science



St. Francis Xavier University



presents

**Modelling and managing ecosystems**

by

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**Monday, June 25, 2007 @ 2:15pm in Annex 124**

A brief background of age-dependent population modelling will be followed by two applied problems. In these problems chronological age is almost irrelevant compared to physiological age. This makes the standard age-dependent model inappropriate and a different formulation necessary.

The first problem deals with an agricultural pest, *Eldana saccharina*, which has caused huge losses to the sugar industry in South Africa. Maturation throughout the life-cycle of this insect is heavily dependent on temperature. It will be shown how the use of an appropriate model of this insect can be used to assist farmers in determining the timing of cane-cutting to minimise damage.

The second problem involves the mud prawn, *Upogebia africana*, whose rate of physiological development depends on the physical conditions within an estuary. This attribute makes them a useful indicator species for evaluating estuarine health. The presentation will include some experience in modelling *Upogebia* to evaluate the effect on an estuarine ecosystem of the timing, frequency and magnitude of water releases from an upstream impoundment.

The talk will conclude with two examples of the possible use of Portfolio Selection Theory to aid in the management of large African herbivores. The first example involves conservation of the endangered black rhino. The second example deals with the sustainable utilisation of multispecies herbivories on commercial game ranches.

**Coffee and Donuts will be served before the talk in AX24A**