McMASTER UNIVERSITY

GRADUATE PROGRAM IN STATISTICS

STATISTICS SEMINAR

Speaker: Dr. Paul Joyce, Department of Mathematics and Department of Statistics, University of Idaho

Title: *"Uniform Integrability and Its Implications for Likelihood Ratios from Population Genetics"*

Day: Tuesday March 22, 2005

Time: 3:30 - 4:30 PM

Place: HH/217 – Deloitte Colloquium Room (refreshments in HH/216 at 3:00 PM)

SUMMARY

Is the limit of an integral always equal to the integral of the limit? We all learned in calculus that the answer to this question is NO! There are many counterexamples. However, one might argue that in all practical applications one can always interchange limit with integration. The technical condition required to justify this interchange is called `uniform integrability'. Here we give an example from population genetics where the uniform integrability condition does not hold. This rather technical mathematical fact has profound implications on the limiting behavior of two competing models that attempt to explain certain patterns of genetic diversity.

REEFERENCES

Gillespie, J.H. (1999) "The Role of Population Size in Molecular

Evolution," *Theoretical Population Biology* **55**, pp. 145-156.

Griffiths, R.C. (1988) "Distribution of *F* in the Infinitely-Many-Alleles Model," Statistics Research Report #183, Department of Mathematics, Monash University.

Dawson, D.A. & Feng, S. (2004) "Asymptotic Behavior of Poisson-Dirichlet Distribution for Large Mutation Rate," *Annals of Applied Probability* (submitted).

Joyce, P., S. Krone & Kurtz T. (2003) "When Can One Detect Overdominant Selection in the Infinite Alleles Model?" *Annals of Applied Probability* **13**, pp. 181-212.

Joyce, P., Krone, S. & Kurtz, T. (2002) "Gaussian Limits Associated with the Poisson-Dirichlet Distribution and the Ewens Sampling Formula," *Annals Applied Probability* **12**, pp. 101-124.

ABOUT THE SPEAKER. Dr. **Paul Joyce** is Professor of Mathematics, Statistics and Bioinformatics in the Department Mathematics and Department of Statistics at University of Idaho. He has been invited visitor and lecturer at many institutions including University of Washington (USA), Uppsala University (Sweden), Cambridge University (UK), Oxford University (UK), Max Planck Institute (Germany), Basic Research Institute for Mathematical Sciences (UK) and University of Wisconsin (USA). With a large body of research results published in leading journals, Joyce is interested in statistics, probability and stochastic modeling, with particular emphasis on interdisciplinary research involving statistical inference in population genetics, molecular evolution, molecular ecology, systematic biology, molecular biology and bioinformatics.

For more information, please contact Román Viveros at (905) 525-9140 ext. 23425,
e-mail: *rviveros@math.mcmaster.ca*
http://icarus.math.mcmaster.ca/rviveros/StatsSem.html