McMASTER UNIVERSITY

GRADUATE PROGRAM IN STATISTICS

STATISTICS SEMINAR

Speaker: Dr. Arni Srinivasa Rao, Department of Mathematics and
Statistics, University of Guelph

Title: *"Probability Convergence Principles in Virus Dynamics"*

Day: Tuesday January 25, 2005

Time: 3:30 - 4:30 PM

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

SUMMARY

The rate of convergence of an independent sequence of real variables can be well explained using a limit theoretic approach. In this talk, a new methodology developed using limit theory of branching processes will be presented. The main problem addressed is, given a cohort of viruses at time T, what is the probability that this cohort of viruses will extinct at time Tn (for Tn>>T)? The method is successfully applied to explain the probabilities of extinction of the human immunodeficiency virus (HIV) under the regulation of therapy. Application of Cauchy's convergence principle is explored to explain the probability convergence of virus concentrations.   If $U_i = C_i \big/ V_i$ is virus concentration then for

$$t_m = \frac{1}{\theta + \tau} \log\left(\frac{V_0 \in}{C_0}\right),$$ it is proved that the U_i's form a Cauchy sequence. The

notation will be explained in detail in the talk. Published work as well as work in progress will be discussed.

REEFERENCES

1. Rao, ASRS (2004a) "Limiting Theorems on Case Reporting," *Applied Mathematics Letters* **17**(7), pp. 855-859.
2. Rao, ASRS (2004b) "Probabilities of Therapeutic Extinction of HIV," submitted for publication.
3. Rao, ASRS & Kakehashi, M (2005) "Incubation Time Distribution in Back-Calculation," *Mathematical Biosciences and Engineering* (in press).

ABOUT THE SPEAKER: Dr. Arni Srinivasa Rao is currently a Postdoctoral Fellow in the Department of Mathematics and Statistics at University of Guelph. He taught courses in probability and mathematical biology in the Indian Institute of Science. During 1999–2004 he was Visiting Scientist and/or Postdoctoral Fellow at the following places: Indian Institute of Science, Mathematical Institute, University of Oxford, Hiroshima University and Indian Statistical Institute. Rao holds a Bachelor's Degree, majoring in mathematics, from Andhra University. He obtained his Ph.D. in 2001 at IIPS (formerly at Bombay University), researching convolution methods applied to medical data. Rao's research interests include limit theorems, mathematical biology and mathematical statistics, with emphasis on applications to Hepatitis A Virus (HAV) and AIDS epidemiology. He has been an invited speaker at several meetings and conferences. Rao received a DST Young Scientist Fellowship in mathematical sciences, an ISCB Conference Award for research paper, and a Heiwa Nakajima Foundation Award.

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