

Cal Poly Pomona Mathematics and Statistics Department Colloquium

A Bayesian Dynamic Space-Age-Time Model: An Application to Prostate Cancer Mortality Rate

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**A Thesis Defense in Partial Fulfillment of the
Requirements for the Master of Science Degree**

Abstract:

Prostate cancer is the most common cancer among men. It is estimated that almost one-fifth of US men will be diagnosed with prostate cancer during their lifetime. Yet, there is much to be learned of the risk factors concerning prostate cancer. In this thesis, we will focus on examining prostate cancer mortality rates at the county-specific level through a log-linear model. A fully Bayesian hierarchical space-age-time log-linear model is proposed to estimate prostate cancer mortality rate in the State of California

In our model, we introduce random spatial effects and temporal effects to capture the local dependence among regions and time periods, respectively. In addition, we introduce fixed age effects since most epidemiologic data are strongly related to age. We find that prostate cancer mortality rate increases sharply over age. In addition, we see an increasing trend in mortality from year 1999 to year 2000 and then a decreasing trend in all preceding years. We identify counties of high and low rates for age groups and time periods using disease mappings. The methods are demonstrated by male prostate cancer mortality data from the State of California for ages between 45 and 99 during 1999 – 2004.

[Thesis Committee: Dr. Hoon Kim (chair), Dr. Kamta Rai, Dr. D. Singh Gill]

Tuesday, May 29, 2007, 1:00pm-2:00pm in 8-248

Light refreshments served at 1:00pm