

THE CHINESE UNIVERSITY OF HONG KONG

Joint Seminar

**Department of Statistics and
Department of Systems Engineering and Engineering Management**

The Brain, the Universe, and Random Processes on Manifolds

by

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on

**Friday, 1 September 2006
4:00pm – 5:00pm**

in

**Lecture Theatre 3
Lady Shaw Building
The Chinese University of Hong Kong**

Abstract:

I shall start with the observation that, from a statistical point of view, mapping the human brain and analyzing the COBE (Cosmic Background Explorer) data over the entire universe are equivalent problems.

The next step will be to convince you that while handling the brain involves looking at an eight dimensional Whitney stratified manifold, the universe is only a five dimensional problem. Along the way, I shall explain what a Whitney stratified manifold is.

In the third step I shall give the best solution to date (and perhaps the best possible) to finding sharp and practical estimates for the probability that the suprema of Gaussian random fields over such manifolds exceeds given levels, a problem that has been around, albeit in simpler forms, for over 70 years.

To conclude, we shall see what this says about brains and the first few moments after the ‘Big Bang’ and also look at some open problems.

All are Welcome