



UNIVERSITÀ DEGLI STUDI DI BERGAMO

Dipartimento di
Ingegneria dell'informazione e metodi matematici



e

Dipartimento di Matematica statistica informatica
e applicazioni *Lorenzo Mascheroni*

Interdepartmental Seminar Series MAT-STAT Day theme: Spatiotemporal Modelling

Wednesday, January 25, 2012 – Room 15 – via dei Caniana 2– BG
A refreshment will follow

3:00 PM

Spherical Wavelets and their Astrophysical Applications

Prof. Domenico Marinucci, *Dipartimento di Matematica, Università di Roma Tor Vergata*

Abstract In recent years, the construction of wavelets on the sphere has drawn a considerable amount of attention, also in view of strong motivations arising from the analysis of Astrophysical and Cosmological datasets. In this talk, we shall focus on the recent literature on needlets, a form of spherical wavelets introduced by Narcowich, Petrushev and Ward in 2006 and later extended and generalized by many subsequent authors. We shall briefly recall the most important features of the needlets construction, and present recent results on their properties in stochastic circumstances, i.e. for the analysis of spherical random fields. Many of these possibilities have been exploited already, and we shall also mention some applications for the analysis of data from Cosmic Microwave Background Radiation and Gamma Rays observatories. We shall then explore the role of needlets in adaptive estimation, and their extension to spin random fields.

4:00 PM

Statistical Space-Time Models in Challenging Applications

Dott. Francesco Finazzi, *Dipartimento di Ingegneria dell'Informazione e Metodi Matematica, Università di Bergamo*

Abstract: In this talk, the broad applicability of statistical space-time models is demonstrated by considering two distinct problems. The first problem concerns the air quality assessment over large areas by considering both ground level and remote sensing data. A flexible multivariate space-time calibration model able to handle the inherent non-stationarity of the pollution phenomenon and the data complexity in terms of heterotopicity and missing data is introduced. The second problem relates to the estimation of the spatial market potential of a given retail product and to the optimization of the retail network over a geographic area. The spatial market potential is defined as the amount of items that could be sold by a store if placed at a generic spatial location given the existence of other stores. The estimation of the spatial market potential is based on the sales data of spatially distributed stores and on spatial covariates and it is carried out by adopting a geostatistical approach.