



## ΟΙΚΟΝΟΜΙΚΟ ΠΑΝΕΠΙΣΤΗΜΙΟ ΑΘΗΝΩΝ

### ΣΧΟΛΗ ΕΠΙΣΤΗΜΩΝ & ΤΕΧΝΟΛΟΓΙΑΣ ΤΗΣ ΠΛΗΡΟΦΟΡΙΑΣ ΤΜΗΜΑ ΣΤΑΤΙΣΤΙΚΗΣ

**ΠΑΡΑΣΚΕΥΗ 6/6/2014**

**15:00**

**ΑΙΘΟΥΣΑ 607, 6ος ΟΡΟΦΟΣ,  
ΚΤΙΡΙΟ ΜΕΤΑΠΤΥΧΙΑΚΩΝ ΣΠΟΥΔΩΝ  
(ΕΥΕΛΠΙΔΩΝ & ΛΕΥΚΑΛΟΣ)**

**Valantis Malesios,**

Department of Agricultural Development,  
Democritus University of Thrace, Greece

### **Bayesian spatio-temporal epidemic models with applications to sheep pox**

#### **ABSTRACT**

Epidemic data often possess certain characteristics, such as the presence of many zeros, the spatial nature of the disease spread mechanism or environmental noise. This paper addresses these issues via suitable Bayesian modelling. In doing so we utilise stochastic regression models appropriate for spatio-temporal count data with an excess number of zeros. The developed regression framework can incorporate serial correlation and time varying covariates through an Ornstein Uhlenbeck process formulation. In addition, we explore the effect of different priors, including default options and techniques based upon variations of  $\$g\$$ -priors. The effect of different distance kernels for the epidemic model component is investigated. We proceed by developing branching process-based methods for testing scenarios for disease control, thus linking traditional spatio-temporal models with epidemic processes, useful in policy-focused decision making. The approach is illustrated with an application to a sheep pox dataset from the Evros region, Greece.