SUMMER COURSES IN SPATIAL ECONOMETRICS

1. INTRODUCTION TO SPATIAL ECONOMETRICS (June 17th - June 19th)

Prerequisites:
Participants should be familiar with the basic concepts of the following: matrix algebra, probability theory, elements of calculus, and linear regression models. Familiarity with a software package (such as MATLAB or R) is a plus.

Description:
The objective of this course is to provide an overview of preliminary concepts in applied spatial econometrics. Students will learn how to model and incorporate spatial dependencies into their empirical analyses. The course will cover basic concepts ranging from the different typologies of spatial data, to the definition of connectivity in space (spatial weights matrices), to the definition of spatial effects. The course will present the tools to diagnose spatial patterns in the data and estimate the parameters of the spatial lag and the spatial error model using different techniques.

2. SPATIAL ECONOMETRICS I (June 20th - June 22nd)

Prerequisites:
Participants should be familiar with the topics covered during the first course.

Description:
The objective of this course is to provide a comprehensive treatment of various spatial econometric models. The course will focus on single equation Cliff-Ord type models and variations (including the spatial lag and spatial error models). Estimation methods presented will include MLE (maximum likelihood), GMM (generalized method of moments), GLS (generalized least squares), GS2SLS (generalized spatial two stage least squares). Some specification issues will be illustrated along with a discussion of the definition of the parameter space and of the various effects implied by the models. Lagrange Multiplier tests on OLS residuals and a spatial J-test for model specification are presented. We will also examine prediction issues in spatial econometric models.

3. SPATIAL ECONOMETRICS II (June 24th - June 26th)

Prerequisites:
Participants should be familiar with the topics covered during the first two courses.

Description:
The objective of this course is to review some of the recent advances in spatial econometrics. After some further discussion of single equation Cliff-Ord type models, estimation theory in the case of heteroskedastic innovations
by MLE, GMM and GS2SLS is presented. Various forms of spatial HAC covariance matrix estimators are discussed. Specification of various (fixed effects and random effects) spatial panel data models and estimation by MLE and GMM. Simultaneous equation models and seemingly unrelated regression equations (SUR) models. We will also cover the estimation theory in MLE and GM.

4. **INTRODUCTION TO BAYESIAN SPATIAL ECONOMETRICS (June 27th - June 29th)**

**Prerequisites:**
Participants should be familiar with the fundamental concepts of spatial econometric models and fundamental concepts of probability theory. No previous exposure to Bayesian ideas is assumed.

**Description:**
The objective of this course is to introduce participants to the estimation of spatial econometric models using Bayesian econometric techniques. The mathematical derivation of the basic spatial econometric models will be examined as well as the computational techniques used to estimate the models. Topics covered will include: finding full conditional distributions, Markov Chain Monte Carlo techniques such as the Gibbs sampler and the Metropolis-Hastings algorithm, and Bayesian model comparison. Students will be encouraged to experiment with the computer code as well as the estimation of models using their own data.

**Instructors:**
Gianfranco Piras and Donald Lacombe

**Organization:**
The courses are organized into a format that includes morning (theoretical) lectures and afternoon computing lab sessions. A reading list will be provided for each of the topics covered. Additional course materials will be provided. Recommended readings and lab exercises will be available online at the course web page.

**Applications:**
Applicants should submit a curriculum vitae and a brief statement of interest to: Gianfranco.Piras@mail.wvu.edu or Donald.Lacombe@mail.wvu.edu.

**Important Dates:**
Applications accepted as of February 4, 2013
Application Deadline: March 29, 2013
Acceptance Notification: April 5, 2013
Confirm Participation by April 26, 2013

We will be able to admit a limited number of participants based on applications received by the deadline (March 29, 2013). Participation should be confirmed through the payment of course fees on or before April 26, 2013.

**Fees:**

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<th>Courses</th>
<th>Fee</th>
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<tr>
<td>1</td>
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<td>4</td>
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Fees include course tuition, lunches and course material. Submitted fees will be non-refundable. Accommodation and other living expenses are not included. A block of rooms will be reserved at nearby hotels at a discounted rate.