Summer School

Spatial Analysis, Land Use and the Environment

(January 22th to 29th, 2019)

Overview and Purpose: All economic activities have a spatial dimension, which is particularly important in the interface between the economy and the environment. However, this dimension is rarely taken into account when designing economic policies. This summer school motivates a learning process about the state-of-the-art, tools and models for spatial analysis in the fields of land-use and natural environment. In particular, students will have an introduction to spatial methods of analysis and how these methods can be used to improve economic policy advice and landscape management as well as be efficient tools for stakeholder involvement (e.g., landscape visualization).

The summer school will also make available the methodologies when it comes to the application of spatial statistics for economic analysis of environmental problems, urban land management and urban amenities/desamenities. Students will thus learn ways to incorporate space in economic applications, model spatial autocorrelation and spatial heterogeneity along with examples of how these methods can be applied to evaluate environmental amenities and to help design policies. To the effect, up-to-date software, such as R, ArcGIS and Stata will be part of the tool kit used in the summer school.

Topics addressed in the summer school include urbanization, ecosystem service mapping, conservation management, socio-economic development as well as conflict assessments between different land-use interests. Finally, as part of the program, the summer school includes a half-day field trip.

Joint Collaboration: This summer school is an educational collaboration between the Faculty of Economics and Finance, Department of Economics, Master Program in Economics and Research Vice-presidency at Universidad del Pacífico in Lima, Peru and the Nova Environmental Economics Knowledge Center at Nova School of Business and Economics in Lisbon, Portugal.

Instructors: The Nova SBE team includes Maria A. Cunha-e-Sá, Sofia Franco, Renato Rosa, Carina Silva, Jacob Macdonald and Finn-Henrik Barton. The Universidad del Pacífico team includes Joanna Kámiche and Jacques Julien.

Work Language: English.

Target Audience: The target audience of the summer school is undergraduate and master level students. PhD students and researchers with quantitative background who work on policy-relevant issues, as well as policy analysts with research backgrounds who wish to learn theory and methods related to economic aspects of environmental services and land use management will also be considered.

Prerequisites: Students intending to take this summer school should know econometrics and have experience on multiple regression analysis with cross section and panel data.

Maximum Number of Participants: 30 students.

Learning Outcomes: A successful student in this summer school should be able to:

- Understand basic GIS concepts in an interdisciplinary setting.
- Apply basic ArcGIS for spatial data preparation, analysis and visualization.
- Understand how to integrate GIS data analysis with spatial statistical analysis.
- Apply basic spatial statistical methods to perform environmental valuation and natural resources management.
- Understand choice experiment methods.

Venue and Relevant Dates: The summer school is hosted by the Faculty of Economics and Finance at Universidad del Pacífico, Lima - Peru.

- Summer school is held from January 22th -29th, 2020.
- The application deadline is November 2nd, 2019.
- Acceptance notices will be sent out by December 2nd, 2019.
- The deadline to pay the registration fee is December 16th, 2019.

Application Material: An application consists of a document in English that contains the following information:

1. Brief statement (up to 200 words) of the research interests and the topic of work and why the participant is interested in attending the summer school.
2. List of any statistical or GIS software (for example, Stata, R, ArcMap) that the participant has used, and/or any programming languages, including a short statement of the level of experience (advanced, intermediate, beginner, none).
3. Current CV of a maximum of 2 pages. The CV should at least state the participant´s
    - current position, institutional affiliation;
    - area of expertise and interests or area of study;
    - education level (Ph.D., master, undergraduate or other);
    - experience on spatial statistics, GIS as well as programming skills.

Please send the document to Melissa Villar (ms.villarp@up.edu.pe)

Registration Fee: US$300.

Overall Structure of the Summer School: The summer school consists of one-week intensive program including lectures and practice sessions. Classes are held daily in the morning and afternoon and a half a day of field trip is also planned. Classes will not be held on Sunday.

- Morning class sessions will run from 8:30 am to 10:30 am with a break of 20 minutes. Class will resume at 10:50 am and end at 12:30 pm.
- Afternoon class sessions will run from 2:00 pm to 4 pm with a break of 20 minutes. Class will resume at 4:20 pm and end at 6:00 pm.

Teaching Methods: The teaching methodology includes (a) lectures, (b) discussions, (c) case studies, (d) labs and (e) field trip.

- Some lectures will cover the theory and methods of spatial data analysis and spatial econometrics whilst others will demonstrate the methods in specific areas including urban economics and environmental and natural resource economics.
- Other lectures will also discuss important topics in the field of environmental economics and natural resources.
- Lab classes will give students the opportunity to develop their skills in the application of spatial analysis methods and GIS.
- A range of software will be used including ArcGIS, R and Stata. For those with no prior experience but who wish to gain some initial experience of modelling with R there will be also examples to work on.

- Students will also have the opportunity to visit a natural protected area to make the bridge between lectures and the lab application in the field.

Teaching Material: All teaching material (e.g. PPTs, case studies, reading material, reading list and datasets) will be available to the participants throughout a password-protected Web site.

Exams and Credits: At the end of the summer school there is a take-home exam. Students have one month to complete and submit the final exam. There are two types of certificates: Graded Certificate and Participation Certificate. Students who pass the exam will receive the Graded Certificate. In that case, the course can be used for credit, conditional on the rules of the School where they are enrolled. Students who attend at least 80% of classes and do not take the final exam or fail it will receive a Participation Certificate. Students must note that a Participatory Certificate cannot be used for credit.

Schedule of the Learning Activities & Social Events

Wednesday, January 22nd

7:30 - 8:30: Welcome breakfast & Registration

8:30 – 12:30: **Introduction to Environmental Economics**, Maria A. Cunha-e-Sá

This lecture provides an introduction to the meaning and scope of environmental economics. It will also provide an overview of key economic issues in decision making and key concepts and terminology (e.g. scarcity, market failure, externality, public goods, open resource, efficiency versus equity, among others) that will be employed throughout the summer school.

14:00 – 18:00: **Introduction to Natural Resources Economics**, Renato Rosa

This lecture provides a rationale for, and briefly explains the methodologies used in, the application of economic theory to the allocation of natural resources. It will also provide additional microeconomic concepts and terminology (e.g. renewable and nonrenewable resources, resource rents, economic scarcity, and sustainability, among other) that will be employed during the summer school.

18:30pm - 20:00pm Welcome Cocktail

Thursday, January 23rd

8:30 – 12:30: **Introduction to Spatial Econometrics I**, Sofia Franco

This lecture will provide an introduction to the theoretical and practical challenges associated with analyzing spatial data in the social sciences with a particular focus on spatial econometric modelling. The lecture will pay particular attention to the questions of "think spatially and think statistically" and "what is special about spatial data?" looking at the twin properties of spatial autocorrelation and spatial heterogeneity.

14:00 – 18:00: **Introduction to Spatial Econometrics II**, Sofia Franco

This lecture provides a close inspection of several statistical "workhorses" in the field: spatial lag models and spatial error models. Some applications of these models will be presented and discussed.

Friday, January 24th

8:30 – 12:30: **Application of Spatial Analysis with Spatial Econometrics**, Joanna Kámiche

This lecture will discuss with students how to fit spatial econometric models in the analysis of the relationship between deforestation and road infrastructure in Peru, using real data sets. Students will use R to conduct spatial econometric analysis.

14:00 – 18:00: **Choice Experiment Method**, Jacques Julien

This lecture aims to introduce students the theory and application of the Choice Experiment Method. Indeed, choice experiment is a survey-based method, which has been applied recently to economic valuation of environmental or nonmarket goods. Students will also practice estimating demand and willingness to pay (WTP) for environmental goods and services based on this method. The discussion and practical will focus on the method application for coastal marine ecosystem.

Saturday, January 25th

8:30 – 12:30: ***Pantanos de Villa Wildlife Refuge***, students and instructors team

This is a protected area of marshes located in the district of Chorrillos, one hour away from downtown Lima. These unique wetlands cover an area of approximately 263 hectares and are the only protected area within Lima city limits. The marshes are an important ecological area not only for flora and bird fauna but also for scientific, educative and recreational uses. A map of this natural area can be found at https://bit.ly/2k84xED

Monday, January 27th

8:30 – 12:30: **Introduction to GIS**, Carina Silva & Finn-Henrik Barton

This lab aims to get students started with ArcGIS. Students should examine spatial data on the computer and create their first map without very detailed instructions.

14:00 – 18:00: **Applications with GIS**, Carina Silva & Finn-Henrik Barton

This lab aims to get students started with ArcGIS tools and real data sets in spatial environmental planning processes.

Tuesday, January 28th

8:30 – 18:00: **Application of Spatial Analysis with Spatial Econometrics**, Sofia Franco & Jacob Macdonald

These labs aim to teach students how to fit spatial econometric models and basic spatial analysis with spatial econometrics using real data sets. Software R will be used in these labs.

Wednesday, January 29th

8:30 – 18:00: **Introduction to efficiency and productivity analysis**, Jacques Julien

The lecture and lab will offer useful tools to carry out performance analysis of firms or any production units in order to help decision makers to guarantee their firm's competitiveness. Analytical and empirical techniques will be used to conduct productivity and efficiency analysis. Students will learn to estimate empirically production functions using several functional forms to identify and analyze types of production frontier.

Night: Farewell Cocktail.

Instructors

Environmental Economics Knowledge Center

NOVA SCHOOL OF BUSINESS & ECONOMICS

Maria A. Cunha-e-Sá

Associate Professor (with Habillitation) at NovaSBE. She got a PhD in Economics at the University of Illinois at Urbana-Champaign, USA. Her fields of interest are Environmental and Natural Resource Economics, and Microeconomics, with emphasis on economic valuation of environmental goods and natural resources modeling. She has experience in projects 'coordination. She has published in several international scientific journals, such as the Journal of Environmental Economics and Management, American Journal of Agricultural Economics, Land Economics, Environment and Resource Economics Journal, Journal of Economic Dynamics and Control, Energy Economics, Ecological Economics, among others. She is a member of the Editorial Board of Environment and Development Economics since 2008 and of Economia Agraria y Recursos Naturales (EARN) /Agricultural and Resource Economics of the Spanish Association of Agricultural Economics since 2014, and she serves as referee to the journals in the field. Maria was Vice-President of the European Association of Environmental and Resource Economists (EAERE), and President-elected of the Associacion Hispano-Portuguesa de Recursos Naturales y Ambientales (AERNA) from 2008 to 2012. She is also the country representative for Portugal in the EAERE. Maria is co_scientific director of the Nova Environmental Economics Knowledge Center since November 2017, when it was launched.

Sofia F. Franco

Associate Professor (Adjunct) at Nova SBE and a visiting faculty at the Economics Department at the University of California-Irvine, USA since 2014. Sofia has also been a consultant to the World Bank, to the National Center for Smart Growth Research and Education, USA and to Portuguese private companies and governmental entities on topics related to urban development and sprawl, urban policies and economic evaluations. She got her PhD in Environmental Science and Management at the University of California-Santa Barbara, USA. Sofia is an applied microeconomist with a research agenda that lies at the boundaries of environmental, urban and transportation economics, and uses state-of-the-art econometric and computable general equilibrium methods, as well as geographical information tools. Most of her work consists of theoretical and spatial empirical assessments of major public policy issues and on the evaluation of urban amenities and disamenities in the USA and in Portugal. Her research has appeared in top peer-reviewed academic journals and has also been presented in several major international conferences.

Renato Rosa

Principal Investigator at Nova SBE and is also co-scientific director of the Nova SBE Environmental Economics Knowledge Center. He holds a PhD degree in the field of Environmental Economics from Nova SBE. From 2008 to 2011 he worked at Fondazione Eni Enrico Mattei, where he developed research in the integration of forestry, agriculture and land use topics into numerical macroeconomic models. His research interests focus on renewable resources and ecosystem services with a particular emphasis on multidisciplinary bio-economic modelling. Recently, his joint work with fish and forestry scientists resulted in two bioeconomic models for Portuguese forests and a bioeconomic model for the Ibero-Atlantic Sardine stock. His research has been published in top field journals.

Carina Silva

Research Associate at Nova SBE. Carina is an environmental biologist with a Ph.D. in Climate Change and Sustainable Development Policies with a Specialization in Environmental Sciences. With expertise in Geographic Information Systems (GIS), throughout her career, she had the opportunity to apply GIS in multiple areas, such as environmental impact assessment and monitoring, mammal conservation, and ecosystem services. She has followed a transdisciplinary approach trying to bridge the gap between natural sciences and economics, aiming to improve biodiversity conservation and environmental management in general. Her research focuses on the economic valuation of ecosystem services and its potential to inform decision making.

Jacob Macdonald

Research Associate at Nova SBE. Carina is an environmental biologist with a Ph.D. in Climate Change and Sustainable Development Policies with a Specialization in Environmental Sciences. With expertise in Geographic Information Systems (GIS), throughout her career, she had the opportunity to apply GIS in multiple areas, such as environmental impact assessment and monitoring, mammal conservation, and ecosystem services. She has followed a transdisciplinary approach trying to bridge the gap between natural sciences and economics, aiming to improve biodiversity conservation and environmental management in general. Her research focuses on the economic valuation of ecosystem services and its potential to inform decision making.

Finn-Henrik Barton

Research Assistant at Nova SBE. Finn focusses on the integration of GIS and Economics. He obtained his MSc at the London School of Economics, UK in Environmental Economics and holds a BA in Geography and Economics from Lancaster University, UK. Recently, he has been working on topics related to spatial competition in the parking garage industry as well as exploring the socio-economic drivers of land-use changes in Portugal using spatial models and GIS techniques.

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Joanna Kámiche

Assistant Professor at Department of Economics, Universidad del Pacífico and Researcher on Economics of Natural Resources and Environment at the Research Center, Universidad el Pacífico (CIUP). PhD (c) in Agricultural Economics and Natural Resources, University of Connecticut. Master in Economics of Natural Resources and the Environment by the Joint Program of the University of Los Andes (Colombia) and the University of Maryland (USA), as well as Specialist in Social Project Evaluation by the University of Los Andes (Colombia). Joanna has a degree in economics from Universidad del Pacífico. She has been a consultant for the Department of Finance, Department of Agriculture, and Department of Environment in Peru, as well as for International Cooperation institutions such as the Inter-American Development Bank (IDB), German Development Cooperation (GIZ) among others. Her topics of interest are agricultural economics, disaster risk management, economic valuation, economics of solid waste management and social evaluation of public investment.

Jacques C. Diderot Julien

Affiliated Researcher at the Research Center of Universidad del Pacífico and an Adjunct Professor of Economic Valuation of Environmental and Natural Resources and Microeconomics at Universidad del Pacífico. Ph.D. candidate from University of Connecticut (USA). Master in Economics of Natural Resources and the Environment by the Joint Program of University of Los Andes (Colombia) and University of Maryland (USA). He holds a B. S. Applied Economics and Statistics, CTPEA Centre de Techniques de Planification et d'Economie Appliquée, Haiti. His fields of interest are Environmental and Agricultural Economics, Natural Resources as well as Development Economics. He is specialized in quantitative studies on productivity and efficiency, impact evaluation of public policies, economic valuation in environmental issues, impact assessment of natural disasters and economics of solid waste management.