



MAX PLANCK INSTITUTE
FOR DEMOGRAPHIC
RESEARCH



Federal Institute for
Population Research

Announcement
WORKSHOP ON
**"Introduction to R and Spatial Analysis with R
Model Approaches, Maps, and Big Geodata"**

August 20-25, 2018

Conducted by
International Institute for Population Sciences, Mumbai, India
in collaboration with
Max Planck Institute for Demographic Research, Rostock, Germany
&
Federal Institute for Population Research, Wiesbaden, Germany

Course coordinators:
Prof. Usha Ram and Dr. Sebastian Klüsener

Location: IIPS Mumbai

IMPORTANT DATES

Registration starts: July 3, 2018

Last date: July 30, 2018

No. of seats available: 25

Target group: The target participants are students with a Masters / MPhil degree and research scholars pursuing their PhD and/or those completed in the past 2-3 years. We also encourage young faculty to apply for the same.

Eligibility: Selected candidates should have a demography/population studies background from a well-recognized university/institute with a good academic record.

Registration fee: No fee

Accommodation: Accommodation at the IIPS hostel on payment would be provided to the external participants during the workshop.

Food: The IIPS has a mess facility (breakfast/lunch/dinner). The participants can make use of the IIPS mess during the workshop on payment.

Tea/coffee will be provided during the workshop.

How to apply:

The application form can be **downloaded from <http://www.iipsindia.org/rworkshop2018.htm>** . The completed form must be submitted to IIPS at the email: **rworkshop2018@iips.net** by **no later than July 30, 2018.**

Selected candidates will be informed by email.

Financial support: None

Contact:

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IIPS, Mumbai
Email: rworkshop2018@iips.net

APPLICATION FORM for the R-Workshop

1. Name (in Block Letters): Ms./Mr./Dr. _____

2. Designation: Student Faculty

3. Organization/Institution:

4. Mailing Address:

5. Email: _____ and _____

6. Phone/Mobile:
Work: _____
Residence: _____
Mobile: _____

7. Age:

8. Gender: Female Male

9. Qualification (highest degree with subject and university):

10. Brief description:
- a. Specialization
 - b. Knowledge of Computer usage
 - c. Statement of purpose

Date:

Signature:

Place:

Course Instructor: Dr. Sebastian Klüsener

Course description:

Over the last years, the open-source statistical program R has become one of the most important tools for quantitative research. It not only allows researchers to conduct statistical analyses, but is also of great help in gathering and preparing data for such analyses. In addition, the spatial libraries of R offer great potential to perform spatial and spatio-temporal analyses. This course has two major objectives. The first objective is to give an introduction to performing statistical analyses in R. The second objective is to provide the participants with skills to conduct spatial analyses in R. Spatial analysis methods are of high relevance as researchers often work with geographically referenced data. In comparative social demographic research, it is very common to contrast populations across countries or regions. As a result of the big data revolution, we are also witnessing a massive increase in individual-level data with spatial location information. One can represent these data in non-spatial tabular form and analyze them with standard statistical techniques that do not make use of the spatial information. However, by ignoring spatial information contained in the data, spatial relationships, spatial trends and spatial contextual effects remain unexplored.

Analyzing spatial data, geographical maps can help to get a first understanding of the data. But patterns in geographical maps may often not be significant as they are simply the outcome of the intrinsic variability of a phenomenon. Significance tests are hence crucial before jumping to conclusions. Modeling geographical data, the exclusion of spatial information can even lead to biases in the statistical models as important modeling assumptions may be violated. Therefore, understanding the spatial processes underlying the relationships of interest can improve overall knowledge of demographic events as well as enhance the usefulness and applicability of statistical models.

In the first part of the course, the participants will learn how to perform standard statistical analyses in R. In the second part, I will give a brief introduction to Geographical Information Systems (GIS), spatial data files and the spatial libraries in R. Course participants will then be getting an overview over tools of descriptive analysis and cartographic presentation as well as basic and more advanced spatial modeling techniques. Thereby, methods to analyze vector data (e.g., countries, regions), point data (e.g., count data of human individuals, centroids of regions) and raster data (e.g., satellite image data) are covered. These methods include Spatial Econometric Models, Geostatistical Models, and Spatial Multi-Level Models. Participants will also learn how to fetch big (geo-)data from online data sources with R-libraries, and to prepare and include these data in their analyses. In addition, I will also provide an introduction to the open-source spatial analysis program Geoda. Around 30% of the time will be devoted to theoretical aspects, and 70% to hands on exercise.

Course prerequisites:

Participants should be familiar with basic multivariate analysis techniques (linear and logistic regression, test of significance, confidence intervals). Prior knowledge of R, Geographic Information Systems, spatial statistics and cartographic techniques is not required.

IIPS

The International Institute for Population Sciences, which celebrated its Golden Jubilee in the year

2006, was established in Mumbai in July 1956 with joint collaboration of the United Nations Population Fund (UNFPA), the Government of India, and the Sir Dorabji Tata Trust to serve as the regional institute for training and research in population studies for the countries in Asia and the Pacific region. The Institute is a “Deemed University” functioning under the administrative control of the Ministry of Health and Family Welfare, Government of India. This is the only institute of its kind in the world exclusively devoted to teaching and research in population and health related issues. The IIPS alumnus are occupying prestigious positions in international and national organizations, universities, development agencies, and non-governmental organizations, and have created a brand value for the Institute. The Institute is running a number of research activities in collaboration with international and national research institutes/organizations and universities. The Institute plays a pivotal role in planning and development of the country by generating valuable health and development indicators through nationwide large scale sample surveys at state and district level, and is a National Nodal Agency for conducting the prestigious surveys like NFHS (DHS-India), DLHS, LASI, SAGE, GATS, and Youth Study. Until 2018, the Institute has trained 3953 students (3275 from India and 678 from 41 different countries) through various courses.

MPIDR

The Max Planck Institute for Demographic Research (MPIDR) in Rostock, Germany, is one of the leading demographic research centers in the world. Committed to basic research, international teams of researchers investigate demographic change, aging, fertility, digital demography, and other issues at the forefront of population research. The institute has flat hierarchies, which also allow early-career scientists to propose and realize excellent research ideas; the level of financial support for data acquisitions, international collaborations, and conference participations is highly competitive. It is thus not surprising that over the last two decades the MPIDR has allowed many of today’s leading demographers to boost their careers. The MPIDR is strongly committed to teach core demographic theories and methods to the next generation and to bring new promising approaches from other scientific fields into demography. The European Doctoral School of Demography (EDSD) is an 11-month program open to students with a master’s degree, enrolled in a European PhD program. International Advanced Studies in Demography (IDEM) is a training program focused on offering courses on specific topics and methods. The MPIDR publishes the international peer-reviewed journal Demographic Research

BiB

The Federal Institute for Population Research (BiB) in Wiesbaden, Germany, is an important reference for the German Federal Government and the Ministries when it comes to population-related issues. It is also an important partner for research facilities at home and abroad in the field of population studies. The Federal Institute for Population Research operates within a wide-ranging scientific field, including third party funded projects, and distributes service contracts, especially in connection with the analysis of large own surveys. Often, the BiB collaborates with international organizations – bilaterally and multilaterally. As a basis for decisions of the German Government and its ministries, the BiB gives advice concerning interpretations of demographic trends and analyses. Population topics are of cross-departmental importance – nationally as well as internationally –, for instance in the field of social security, health, migration, family and education. The Institute provides information and interprets demographic topics for representatives of the portfolio, members of parliament, government officials, the educational sector, the press, companies, and other groups. The BiB publishes the international peer-reviewed journal Comparative Population Studies (CPoS).

Day-wise details of the coursework

Class 1	Introduction to the course
20/08/18 10:00-13:00	Managing whole research processes in R in a reproducible form (data extraction, data preparation, analysis, output); Recent developments in R (Base library vs. data preparation, analysis, output); Recent developments in R (Base library vs. Tidyverse packages); Examples: The simple principles of object-based programming Defining and handling data objects in R; Group work
Class 2	Introduction to R
20/08/18 14:30-17:30	Basic operations (data import/export, loops, plots) Fetching data and geodata from web-databases into R; Organizing data in R; Group work
Class 3	Statistical Analysis in R
21/08/18 10:00-13:00	Regression models, cluster analysis, chi-squared test; Diagnostics; Group work
Class 4	Spatial Demography
21/08/18 14:30-17:30	The role of spatial location and distance in demographic processes Spatial Demography in practice; Spatial libraries of R; Simple and publishable maps in R; Group work
Class 5	Basic Principles and Challenges of Spatial Analysis
22/08/18 10:00-13:00	Modifiable areal unit problem Ecological and individualistic fallacies; spatial dependence vs. spatial heterogeneity; Conceptualizing spatial dependencies (spatial weight matrices); Group work
Class 6	Descriptive and Explorative Methods
22/08/18 14:30-17:30	Theil's index of inequality Global and local indicators of spatial autocorrelation; Empirical Bayes smoother to map risks of rare events; Group work
Class 7	Introduction to Spatial Modeling I
23/08/18 10:00-13:00	Accounting for spatial dependence in regression models Spatial econometric models (Lag/Error/Durbin); Group work
Class 8	Introduction to Spatial Modeling II
23/08/18 14:30-17:30	Spatial econometric vs. Geostatistical approaches Geographically Weighted Regression; Short introduction to Geoda; Group work
Class 9	Thematic Cartography
24/08/18 10:00-13:00	Generalization Categorization of data; Coloring schemes; Pictograms; Cartograms; Group work
Class 10	Multi-Level Analysis with Individual and Contextual Data
24/08/18 14:30-17:30	Potentials and pitfalls of contextualizing individual behavior Spatial multi-level models; Group work
Class 11	Combined Analysis of Raster, Point and Vector Data
25/08/18 10:00-13:00	Visualizing data outputs in raster and vector form Geostatistical models combining raster, point, and vector data; Short introduction to QGIS; Group work
Class 12	Simulation Approaches in Spatial Analysis
25/08/18 14:30-17:00	Advantages and disadvantages of simulation approaches Agent-based models of spatial phenomena; Group work
17:00-17:30	Conclusion and outlook