

The Institute of Farm Economics, the Institute of Rural Studies and the Institute for Biodiversity, three of 14 specialized institutes of the Johann Heinrich von Thünen-Institute, Federal Research Institute for Rural Areas, Forestry and Fisheries, invites applications for

3 Research Scientists

for a fixed-term of 48 months to engage in the research project „**Assessing the potentials of remote sensing data in the fields of land use, agricultural economics and biodiversity**“.

In a working group at the Thünen-Institute in cooperation with the Julius-Kühn Institute (JKI) (Institute for Crop and Soil Science), the Technical University of Berlin (Geo-Information in Environmental Planning (EB5) and the University of Bonn (Institute of Food and Resource Economics you will assess) existing approaches and develop new ones to facilitate the use of remote sensing data (satellite) in the field of land use, agricultural economics, and biodiversity in agricultural landscapes. The overall aim is to improve the impact assessment for agricultural policy, which is an integral part of the policy advice provided by the Institute.

So far, the resolution of freely available satellite remote sensing data in Germany and in the EU was too low and thus only of limited use for the description and analysis of land use dynamics. Since 2015, the European Earth observation programme “Copernicus” provides high resolution satellite remote sensing data regarding area and time dimensions. This new quality of data offers the opportunity to display up-to-date information on the land use and land use structures in Germany with a high degree of spatial accuracy for each single plot of land. Thus, this satellite remote sensing data could help to improve the explanation of the relationship between land use intensity and its regional distribution and to better answer questions regarding the protection of abiotic resources as well as the distribution and development of biodiversity.

Job description at the Institute of Farm Economics (reference number 2016-22A-BW):

The main aim is to extend the existing estimation approach for the Thünen-Atlas on agricultural use (www.thuenen.de/thuenen-atlas) with remote sensing information on cropping pattern and to develop appropriate inference statistics. Remote sensing data, provided by JKI, will be used in the statistical estimation approach developed for the Thünen-Atlas to improve the fit of the downscaling. Additionally, it should be assessed, how other data sources (data collection on soil use, IACS) could be complemented or substituted.

The following objectives should be achieved:

- Updating the “Thünen-Atlas on agricultural use” as well as the inclusion and analysis of field specific remote sensing data
- Development of methods and their applications to assess the quality of the estimation models (inference statistics)
- Map on agricultural plots for Germany
- Completion of a PhD by publishing scientific papers and presenting results at national and international workshops and conferences

Job specifications:

- Very good knowledge in mathematics and/or geo-statistics
- Experience in programming required (e.g., GAMS, R, C++ or JAVA)
- Knowledge of application and development of geostatistical procedures desired
- General knowledge of agricultural production systems - especially in crop production – desired

Job description at the Institute of Rural Studies (LR) (Code 2016-22B-LR):

The primary job within the Institute of Rural Studies is the analysis of remote sensing data and land-use pattern provided by the JKI in order to identify meadows and pastures. The focus of the work is the determination of the **land use intensity and yield** based on the cutting dates and frequency and other sward characteristics of **cultivated grasslands**. The results shall be validated with other data sources (agricultural statistics, IACS).

The determination of grassland yields with a high resolution should contribute to the task to delimit yield relevant site conditions and economic preferences with the help of geostatistical methods. The results allow improving the impact assessment of changing political, economic or climatic conditions.

The following objectives should be achieved:

- Development of methods and their application to determine the land use intensity and land use type on grasslands for large areas based on remote sensing data (radar and optical)
- Development of methods and their application to determine the yield of grasslands for large areas based on remote sensing data (radar and optical)
- Calibration and validation of the results based on farm level data and information from agricultural statistics
- Completion of a PhD by publishing scientific papers and presenting results at national and international workshops and conferences

Job specifications:

- Profound knowledge of automated processing and analysing of remote sensing data (radar and optical) with the help of ENVI, ERDAS and Python
- Experience in time-series analysis of remote sensing data in particular with respect to the delimitation of vegetation based parameters of sward development
- Hands on experience in the application on development of geostatistical methods is beneficial
- General background knowledge on agricultural production systems in Germany or comparable regions – in particular forage cropping – is desired

Job description at the Institute of Biodiversity (reference number 2016-22C-BD):

The project coordinated by the Institute of Biodiversity is aimed at investigating the usefulness of satellite remote sensing data for explaining and predicting the spatial distribution of selected components of farmland biodiversity. The project focuses on extensively managed semi-natural grassland habitats that are of great importance for the conservation of biodiversity in agricultural landscapes. As a first step, the project aims to derive parameters from remotely sensed data (e.g. phenological, structural) that enable the identification and spatial differentiation of semi-natural grassland habitats managed at different intensities. In a second step, statistical analyses are conducted to test whether these remotely sensed parameters can act as indicators for plant biodiversity. Detailed data on plant species diversity in different grassland types are available at the Institute of Biodiversity and will be used for calibration and validation (ground truth data). Finally, spatial modelling approaches are applied considering both, parameters from remotely sensed data and ancillary data such as topographic and hydrologic parameters.

The following objectives should be achieved:

- Development of methods and derivation of parameters for identifying semi-natural grassland habitats
- Statistical analyses to test whether remotely sensed parameters can act as indicators for plant biodiversity
- Modelling the spatial distribution of selected components of biodiversity using remotely sensed data
- Completion of a PhD by publishing scientific papers and presenting results at national and international workshops and conferences

Job specifications:

- In-depth knowledge and experience with time series analysis of remote sensing data (radar and optical)
- Experience in the derivation of vegetation parameters (e.g. phenological, structural) using satellite remote sensing data
- Profound understanding of ecological processes in agricultural landscapes and experience in analysing biodiversity data (e.g. vegetation data)
- Experience in species distribution modelling (with R)
- Willingness to travel (car driving license is required)

Common Information:

The positions are to be filled as soon as possible for the duration of 48 month. The job offer is primarily directed to applicants who wish to pursue further academic qualification and includes the possibility to work on a PhD thesis in close cooperation with the Technical University of Berlin (Geoinformation in Environmental Planning (EB5)), or the University of Bonn (Institute of Food and Resource Economics). The temporal contract-limitation is based on § 2 Abs. 1 Wissenschaftszeitvertragsgesetz. Job location is Braunschweig.

Job specifications (all positions):

- University degree (Univ.-Dipl./M.Sc.) in Agricultural -, Environmental-, Geo- or Mathematical sciences or comparable fields, if possible with a specialisation in remote sensing
- Experience with processing remote sensing data are very appreciated
- Good knowledge with statistical data analysis (e.g. using the software packages R or Python) and a good understanding of geographic information system related software
- Knowledge in using databases with SQL (e.g. PostGIS) is appreciated
- Knowledge of agricultural production system – particular plant production – is appreciated

Personal requirements for all positions

- Analytical skills
- Ability to work goal-oriented in teams as well as independently
- Ability to present complex issues to different target groups
- Very good knowledge of English, both spoken and written; knowledge of German is an asset
- Willingness to travel

We offer the involvement in a dynamic research institute and a position in applied sciences with a high degree of autonomy and creative development and interdisciplinary and international collaboration. As we rate the personal and professional development of our staff highly important, we offer a family-friendly working environment, flexible working hours and a comprehensive range of training courses.

The working contract and employment conditions are based on the German Tarifvertrag für den öffentlichen Dienst (TVöD) (Wage agreement for public service). Remuneration is according to wage group 13 TVöD. The possibility of part-time employment will be checked when there is an interest to work on a reduced weekly hour level (full-time is 39 hours/week).

The Thünen Institute supports gender-equality. Qualified female applicants are encouraged to apply. Disabled persons with similar qualification are specifically considered. Only a minimum physical aptitude is expected from them.

Any questions will be gladly answered:

- **for reference number 2016-22A-BW** by Dr. Alexander Gocht (E-Mail: alexander.gocht@thuenen.de, Phone: 0531/596-5151),
- **for reference number 2016-22B-LR** by Dr. Norbert Röder (E-Mail: norbert.roeder@thuenen.de, Phone: 0531/596-5215) und
- **for reference number 2016-22C-BD** by Dr. Sebastian Klimek (E-Mail: sebastian.klimek@thuenen.de, Phone: 0531/596-2540)

Interested candidates should send their applications (including introductory letter, CV, copies of relevant certificates) in electronic form as **one file** before **01.02.2017** to

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