

# Scientific developer for ecological applications of LiDAR Remote Sensing

## Vacancy - Terms of reference

**JOB TITLE:** Scientific developer for ecological applications of LiDAR Remote Sensing.

**PURPOSE:** Contribute to building workflows, Virtual Research Environments and Virtual Laboratories for ecological applications in biodiversity and ecosystem science using airborne and spaceborne LiDAR data.

**LOCATION:** LifeWatch-ERIC Virtual Laboratory and Innovation Center, Amsterdam, The Netherlands.

**POSITION:** Full-time, two-year term with a possible extension, starting as soon as possible.

**COMPENSATION:** Between €3,353 and €4,402 gross per month, depending on relevant experience (equivalent to University salary scale 10), based on 38 hours per week.

## Job Description

We have a job opening for a two-year LiDAR Remote Sensing Scientist for ecological applications at the University of Amsterdam, The Netherlands. The person will be responsible for developing scientific workflows for ecological applications in biodiversity and ecosystem science using airborne and spaceborne LiDAR data. The person will also closely interact with computer scientists and software engineers to make the workflows and tools available in the context of a Virtual Research Environment (VRE).

We are looking for a candidate with exceptionally strong skills in LiDAR processing and ecological applications of LiDAR data in relation to biodiversity and ecosystems. The person will develop workflows using LiDAR data from multiple country-wide airborne laser scanning surveys as well as from spaceborne observations of the new Global Ecosystem Dynamics Investigation (GEDI). Ecological applications can include (but are not restricted to) species distribution or biodiversity models with LiDAR metrics, land cover and habitat classification and mapping using LiDAR with machine learning, or change detection of ecosystem structure using multi-temporal LiDAR datasets. The person should show a passion for biodiversity and ecosystems and a deep understanding of how biodiversity and ecosystems change due to natural processes or human impact. Excellent programming skills in Python and R and experience in GIS and geospatial analyses are required. Additional experience in handling other Earth observation and remote sensing data is advantageous. The candidate should also show strong writing and verbal communication skills and have a successful track-record of publications.

You will develop scientific workflows in the context of establishing a Virtual Lab for ecological applications of LiDAR data. This will include the processing of various national, multi-terabyte



airborne LiDAR data using a newly developed point cloud processing software tool [Laserchicken](#), and a related High Performance Computing (HPC) processing pipeline called [Laserfarm](#), both of which are implemented in Python. You will also process LiDAR data from the Global Ecosystem Dynamics Investigation (GEDI) using e.g. [rGEDL](#). Other open source software tools for processing and visualization of point clouds and raster data (e.g. [rLiDAR](#), [raster](#), [PDAL](#), [GDAL](#)) are also relevant. Using the derived metrics of ecosystem height, ecosystem cover, and ecosystem structural complexity you will develop ecological applications of LiDAR data with relevance to biodiversity and ecosystem science.

This will include national to global analyses of species distributions, ecosystem structure change, and/or mapping and classification of animal habitats using LiDAR and machine learning.

### **Contract and Working Environment**

The candidate will be contracted by the LifeWatch ERIC Virtual Laboratory and Innovation Center in Amsterdam, The Netherlands and will work within the premises of the University of Amsterdam, Institute for Biodiversity and Ecosystem Dynamics (IBED)

[LifeWatch ERIC](#) is a European Infrastructure Consortium providing e-Science research facilities to scientists seeking to increase our knowledge and deepen our understanding of biodiversity organisation and ecosystem functions and services in order to support civil society in addressing key planetary challenges.

LifeWatch ERIC seeks to understand the complex interactions between species and the environment, taking advantage of High-Performance, Grid and Big Data computing systems, and the development of advanced modelling tools to implement management measures aimed at preserving life on Earth.

Combining a wide range of ICT tools and resources with deep knowledge of the domain, LifeWatch ERIC's mission is to be a "first class" worldwide provider of content and services for the biodiversity research community by:

- Offering new opportunities for large-scale scientific development
- Enabling accelerated data capture with innovative new technologies
- Supporting knowledge-based decision-making for biodiversity and ecosystem management
- Providing training, dissemination and awareness programmes.

The [Institute for Biodiversity and Ecosystem Dynamics \(IBED\)](#) is one of eight research institutes within the [Faculty of Science](#) at the University of Amsterdam. Our scientific work aims at a better understanding of the dynamics of ecosystems at all relevant levels, from genes to ecosystems, using a truly multi-disciplinary approach, and based on both experimental and theoretical research. Scientific focus is on aquatic (both freshwater and marine) and terrestrial ecosystems, evolutionary and population biology, ecosystem and landscape dynamics, and theoretical and computational ecology. We want to unravel how ecosystems function in all their complexity, and how they change due to natural processes and human activities.

You will closely collaborate with computer scientists and software engineers who are developing the technical functionality of Virtual Research Environments (VREs) and the containerization of the applications. It is expected that your work results in scientific papers, and that you participate and present the research at LifeWatch and other international meetings. In your daily work, you

will be embedded in the Biogeography & Macroecology (BIOMAC) lab (<http://biomac.org/>) and the Department Theoretical and Computational Ecology (<http://ibed.uva.nl/research>), and have close links to the [Quality Critical Distributed Computing team](#) of the [Multiscale Networked Systems \(MNS\)](#) research group.

### **The ideal candidate should meet the following requirements**

- A PhD degree in LiDAR, remote sensing, ecology, biodiversity, Earth science or a related discipline;
- interest, passion and experience in LiDAR, biodiversity, computational ecology and Earth observation;
- exceptional quantitative skills and profound experience in handling and processing LiDAR data (e.g. scripting/programming in Python and R, geospatial analyses, handling of remote sensing datasets);
- experience with computational workflows;
- willingness to work in a multidisciplinary team (ecology, computer science; software engineering)
- proficiency in scientific writing;
- ability to speak and communicate in English at an academic level;
- successful and strong track-record of publications.

Of additional advantage:

- strong skills in species distribution modelling, change detection or machine learning
- background in biodiversity informatics and open data science;
- experience in data and computer science;

### **The call for interest is subject to the following procedure**

#### **Further information**

Interested? For more information on this position please contact:

Dr W. Daniel Kisling, associate professor of quantitative biodiversity science (daily supervisor),  
Email: [W.D.Kisling@uva.nl](mailto:W.D.Kisling@uva.nl) ; Visit [Profile Page of Daniel Kisling](#)

#### **Appointment**

We offer a position for 38 hours a week in an exciting, dynamic and international research environment, starting as soon as possible. The full-time appointment will be on a temporary basis for a maximum period of 2 years with opportunities for an extension.

The Collective Labour Agreement for Dutch Universities will be applicable for salary. The annual salary will be increased by 8 % holiday allowance and 8.3 % end-of-year bonus. You will participate in the LifeWatch-ERIC Netherlands pension scheme with RESAVER.

#### **Job application**

Applications should include the following documents, all in one PDF file and in the following order:

- Motivation letter (max. 1-2 pages, containing your motivation for applying and a description of your previous research experience);
- List of your 2-3 most significant publications (incl. a short description in 2-3 sentences what



is interesting in each paper);

- Short outline (max. 1 page) of ideas how to develop EBV data integration workflows and for which specific taxa and ecosystem types (will only be used for evaluating the applicants).
- CV (with applicant's e-mail address and telephone number, documentation of education and complete publication list, and contact details of two professional references [name, address, telephone and email]). References will only be contacted if the candidate is short-listed.

Applications should be sent ultimately at 31 August 2020 to [W.D.Kissling@uva.nl](mailto:W.D.Kissling@uva.nl) with the job title in the subject field.