**Title:** Operationalizing the use of ground-based LiDAR technologies in forest inventories: The R package FORTLS

**Instructors/Affiliation:**

Juan Alberto Molina-Valero (molina_valero@fld.czu.cz)

Department of Spatial Sciences, Faculty of Environmental Sciences, Czech University of Life Sciences Prague, Kamýcká 129, 165 00 Prague, Czech Republic

Adela Martínez-Calvo

Proyectos y Planificación (PROEPLA), Departamento de Producción Vegetal y Proyectos de Ingeniería, Escuela Politécnica Superior de Ingeniería, Universidade de Santiago de Compostela, Benigno Ledo s/n, Campus Terra, 27002 Lugo, Spain

**Description:** This workshop provides a hands-on, applied introduction to the use of ground-based LiDAR technologies -Terrestrial Laser Scanning (TLS) and Mobile Laser Scanning (MLS)- in forest inventory applications, particularly within a statistical sampling framework. Participants will learn to process LiDAR data from acquisition to validation and export of results using open-source tools, specifically the R package FORTLS. The content will cover an overview of commonly used terrestrial LiDAR systems in forestry, estimation of both tree- and stand-level variables through case studies, the role of plot design, and methods to correct occlusion-related biases. Additionally, the workshop will introduce statistical inference techniques, including both probabilistic and model-based methods, to derive forest metrics such as volume per hectare and estimate associated errors.

The workshop is intended for participants with a BSc, MSc, or PhD background in Forestry or related fields. It emphasizes a practical approach, supported by theoretical concepts to enhance understanding, and involves exercises using real data and validated field measurements.

Participants will gain the knowledge and skills to process ground-based LiDAR data to estimate key forest inventory variables, including stand density, basal area, stem volume,

and height and diameter. They will also learn to evaluate and apply appropriate forest inventory methodologies based on technical criteria and specific forest measurement goals.

**Requirements:** Participants should have a beginner/intermediate level of knowledge with R software and some experience in handling LiDAR data.

The workshop will be developed in R (using RStudio) and CloudCompare software will be also used. In addition, it would also be necessary to have Python installed

To be able to fluently follow the classes participants must attend with their own desktop or laptop computer, for which the following minimum requirements are recommended:

- Processor: Intel I5 or higher (or AMD with similar performance).

- Memory: minimum 16 GB.

- Hard disk: solid (SSD).

- Video camera and microphone.

**Schedule:** October 23, 9:00 AM – 1:00 PM (EST)

**Duration:** 4 hours.

**Image (Insert image or graphic here):**