



Doctoral Thesis Proposal: Improvement of the characterization of forest structure in Mediterranean forests through the incorporation and analysis of *Terrestrial Laser Scanning* (TLS) data.

Supervisor: Luis Ángel Ruiz Fernández

Abstract: An accurate characterization of the forest structure is the fundamental basis for making proper decisions related to forest resources. Nowadays there are many different kinds of mapping (Ruiz *et al.*, 2016) and forest inventories techniques depending on the goals, scale, available resources, and required accuracy, among others is the airborne LiDAR (Light Detection and Ranging), whose applications and parameters optimization (Ruiz *et al.*, 2014) has become relevant in recent years. TLS is a measuring technique which enables the assessment of forest structure and the surrounding three-dimensional (3D) distribution of plant components with periodic estimations, rapidly, automatically and in millimeter-level detail (Liang *et al.*, 2016). Nevertheless, there are some methods, experimental setups, and techniques that have to be improved and tackled, in particular for monitoring the Mediterranean forest, being the objectives of this thesis: (i) Optimization of the TLS data acquisition procedure for sample plots as well as its preprocessing; (ii) Segmentation of aboveground biomass strats (stems, leaf area, shrubs) (Maas *et al.*, 2008; Kankare *et al.*, 2015); (iii) Study of mixed models of forest structure estimation variables including the specific objectives: (iii.a) reduction and replacement of field measurements, if possible, with TLS acquired data; (iii.b) improve ALS/UAV forest models via TLS (Hopkinson *et al.*, 2013; Lindberg *et al.*, 2012). All of that aims to contribute to optimize, speed up and assure a continuous characterization of the Mediterranean forest structure.

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