Keynote #2: Jordi Garcia-Gonzalo (SuFoRun, Centre Tecnològic Forestal de Catalunya):

Title: *International Research on Models and decision support tools for Forest Planning under risk and Uncertainty*

Abstract: Decision makers are challenged by the need to balance the increasing demand for forest-based services (e.g. recreation, protection, conservation) and wood-based products (e.g. timber, fuelwood) while addressing the uncertainty in future potential provision of goods and services (e.g. wildfires, droughts) as well as future market conditions. Failure to correctly address uncertainty on forest planning may leave for example to forestry operators unable to satisfy industry demand for timber or fulfill supply commitments. It may also geopardize protective measures for certain species. Thus, it is needed to use planning methods that allow to incorporate risk and uncertainty in the planning process.

The planning challenge addressed in this paper integrates uncertainty of future forest growth and timber prices with the need to consider three criteria; net-present value, carbon sequestration, and land erosion caused by the road construction within the forest while including the adjacency constraints to limit the maximum contiguous area harvested within the same planning period. The decisions for each planning period include which stands to harvest and which roads must be built. By using mathematical programming tools and stochastic optimization techniques, we develop a stochastic multicriteria model that enables decision makers to have not only one, but a pool of long term planning policies. Moreover, a risk-averse variant of the framework is also considered. The proposed approach is used on a eucalyptus forest located in Portugal; the obtained results show the benefit of the proposed framework for producing sustainable forest plans with efficient trade-offs among the three considered criteria.