

## Topic for a Bachelor or Master Thesis

# Determining diameter / basal area of tree stumps

### Background

The assessment of stump characteristics is a component of some forest inventories, in particular when interest is in ex-post determining the quantity of removals, for example in the context of estimating the total volume of illegally logging in the inventory region.

There are various models that allow predicting unknown *dbh* from measuring the diameter of the tree stump; also, modern taper functions when available allow such prediction.

However, there are various mensurational challenges when it comes to “measuring the diameter” of a tree stump, owing mainly to irregularities of the cross-section. These challenges are not addressed when developing the mentioned models.



### Scope of the thesis

The thesis shall analyze, evaluate and compare options for determining stump “diameter”.

The thesis research may consist, for example, of (1) practical work determining relationships between stump diameter and *dbh* for a set of sample trees to be harvested, (2) “measuring” stump diameter by different approaches after harvesting, including a smartphone based app developed at AWF by Mr. Jaroslav Bartunek and taper-function based predictions (3) compare predicted *dbh* to “true” *dbh* (measured before felling) and compare “truly” harvested with stump-predicted volume.

Depending on the interest of the candidate, 3D models may be established from the standing tree that allow “reading” diameter at different heights.

**The thesis may be written in German or English**

**The specific scope of the thesis will be agreed with the candidate and, of course, be adapted to whether it will be a BSc or MSc thesis.**

**If you are interested, please contact Prof. Dr. Kleinn ([ckleinn@gwdg.de](mailto:ckleinn@gwdg.de)) or Dr. Nils Nölke ([Nils.Noelke@forst.uni-goettingen.de](mailto:Nils.Noelke@forst.uni-goettingen.de)) for further information!**

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