



From Forests to Heritage

**A conference on historical timbers
and wooden cultural heritage**

Programme and abstracts

19-21 April 2022
Amsterdam

From Forests to Heritage

A conference on historical timbers and
wooden cultural heritage

organised by:

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Conference website
www.forests2heritage.nl



Online programme

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Non-invasive dendrochronology of large wooden objects: complex use of 3D X-ray μ CT and microscopic imaging helps to date the Saint Louis sculpture

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Achievements in high resolution 3D computed tomography (μ CT) techniques have fostered non-invasive tree-ring analysis of wooden heritage objects. Nevertheless, the size of an object is still a determinant limiting application of micro-tomography. Generally – the bigger the object – the lower achieved resolution. Whereas, the width of tree-rings is crucial factor for image resolution requirements.

We present a case study of non-invasive dendrochronological analysis of a large size (160x70x30 cm) wooden sculpture made of halved Scots pine trunk. Up to recently the Saint Louis sculpture from Vilnius Saint Nicolaus church has been dated by stylistic art-historical evaluation to the 16th or the early 17th century. However, no data has been proving this evaluation.

Investigation of inner structure of the sculpture was carried out using industrial X-ray 3D computer tomograph RayScan 250E. Extended CT mode involving horizontal sideways moving of flat panel detector while rotating the sculpture around its axis allowed to capture approximately 500 mm of the sculpture width. Achieved voxel size of 128 μ m suited for discerning annual rings as narrow as 700 μ m in the reconstructed transversal images. Series of 111 rings were identified and measured with CooRecorder and dated to 1501-1611 AD.

However, visual inspection of the back side of the sculpture has revealed sharp narrowing of rings in the uncaptured side areas. Digital microscope Dino-Lite was used to record ring images in the longitudinal radial plane close to the sculpture edge. In 6.3 cm of this edge zone extra 117 rings were identified, measured and sapwood boundary detected. Consequently, the last ring of the sculpture was dated to 1728 AD.