

## Special session honoring the 70th birthday of John Rudnicki: Micro-CT-based porosity analysis of biomass particles

Qiushi Chen<sup>a\*</sup>, Quan Sun<sup>a</sup>, and Yidong Xia<sup>b\*</sup>

<sup>a</sup> Clemson University, Clemson, SC, USA

<sup>b</sup> Idaho National Laboratory, Idaho Falls, ID, USA

\* corresponding authors: qiushi@clemson.edu; yidong.xia@inl.gov

### Abstract:

Micro-computed tomography (CT), a non-destructive test method, has become a widely used approach in the internal structure analysis of various materials such as porous rocks, granular soils, biological structures, etc. Few studies, however, have mentioned biomass particles. Using loblolly pines as an example, this study focuses on the porosity analysis of biomass particles. Image analysis techniques are employed to process the micro-CT images of a loblolly pine chip, and the associated porosity distribution is evaluated at the micro-scale (as shown in Fig. 1). This research also develops methodology and the visualization tools to demonstrate the spatial distribution of porosity and discusses the resolution of challenges, such as large data processing and enhancement of computation speed, commonly encountered in image-based porosity analyses.

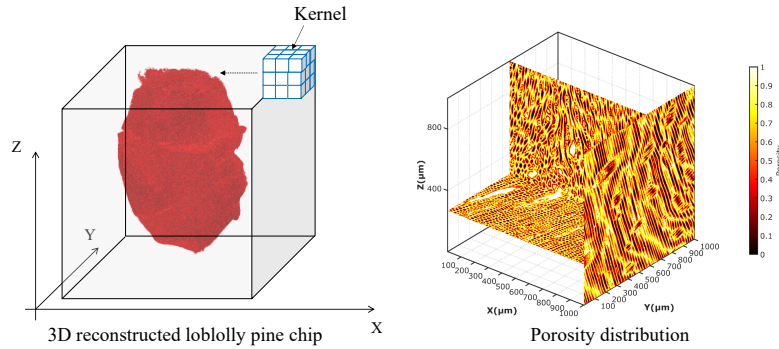


Fig. 1: Reconstructed loblolly pine chip from micro-CT images and the associated porosity distribution