

International Individual Tree Delineation (ITD) Contest 2025

1. Background

Individual trees, as the dominant and fundamental component of forests, play a crucial role in regulating the biophysical processes of forest ecosystems, such as radiation, vapor concentration, and temperature. Understanding individual-tree characteristics supports fine-scale forest management and protection. Light detection and ranging (LiDAR), also known as laser scanning (LS), provides a powerful solution for characterizing and understanding forest structure and function. Therefore, three-dimensional (3D) individual tree delineation (ITD) through LiDAR data has become a fundamental step toward extracting detailed tree-scale 3D structural traits.

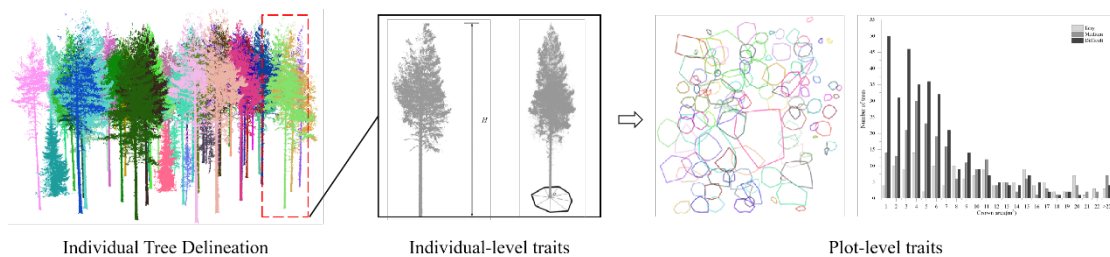


Figure 1. Individual tree delineation through point clouds supports fine-grained 3D structural traits extraction at both individual- and plot-level (Liang et al., 2025).

2. Contest overview

The International Individual Tree Delineation (ITD) Contest 2025 is the second event in this series, following the first one held in 2014 (Liang et al., 2018). The contest aims to benchmark and advance the state-of-the-art (SOTA) in 3D ITD using close-range LiDAR data, by evaluating and comparing a wide range of conventional machine learning (ML) and deep learning (DL) approaches. The international ITD contest 2025 is organized with the support of the International Society for Photogrammetry and Remote Sensing (ISPRS).

Participants are encouraged to use the dataset provided by the contest to develop their own ITD methods and submit their inference results. The organizers will evaluate all submitted results and benchmark the methods using standardized procedures and metrics. The contest outcomes will be analyzed and reported to showcase the progress achieved over the past decade, identify remaining challenges, and outline future directions for development. The top six teams will be invited to the award ceremony (time and location to be confirmed) and will receive travel grants of up to USD 3,000.

For more details and the participation of the contest, please visit:

- Contest page:

<https://www2.isprs.org/commissions/comm3/wg1/activities/itd-contest-2025/>

- Contest online platform:

https://www.codabench.org/competitions/8043/?secret_key=ed7dde51-2deb-4bab-acaa-6eee2ba74358

3. Dataset

The ITD dataset provided by this contest consists of LiDAR point clouds collected from various forest types around the world using multiple platforms including, terrestrial (TLS), mobile (MLS), and unmanned aerial vehicle (ULS) systems. The dataset also includes tree-level annotations. Datasets are provided for participants to develop their ITD methods and to evaluate their performances.

The dataset includes point clouds both in their original resolution and in a resampled resolution of 5cm (3D). Due to the limitations of the online system, evaluations will be conducted using the 5cm resolution data. Namely, the participants can process the data using the original resolution and down sample the results to 5cm resolution, or alternatively, directly work on the provided 5cm resolution data.

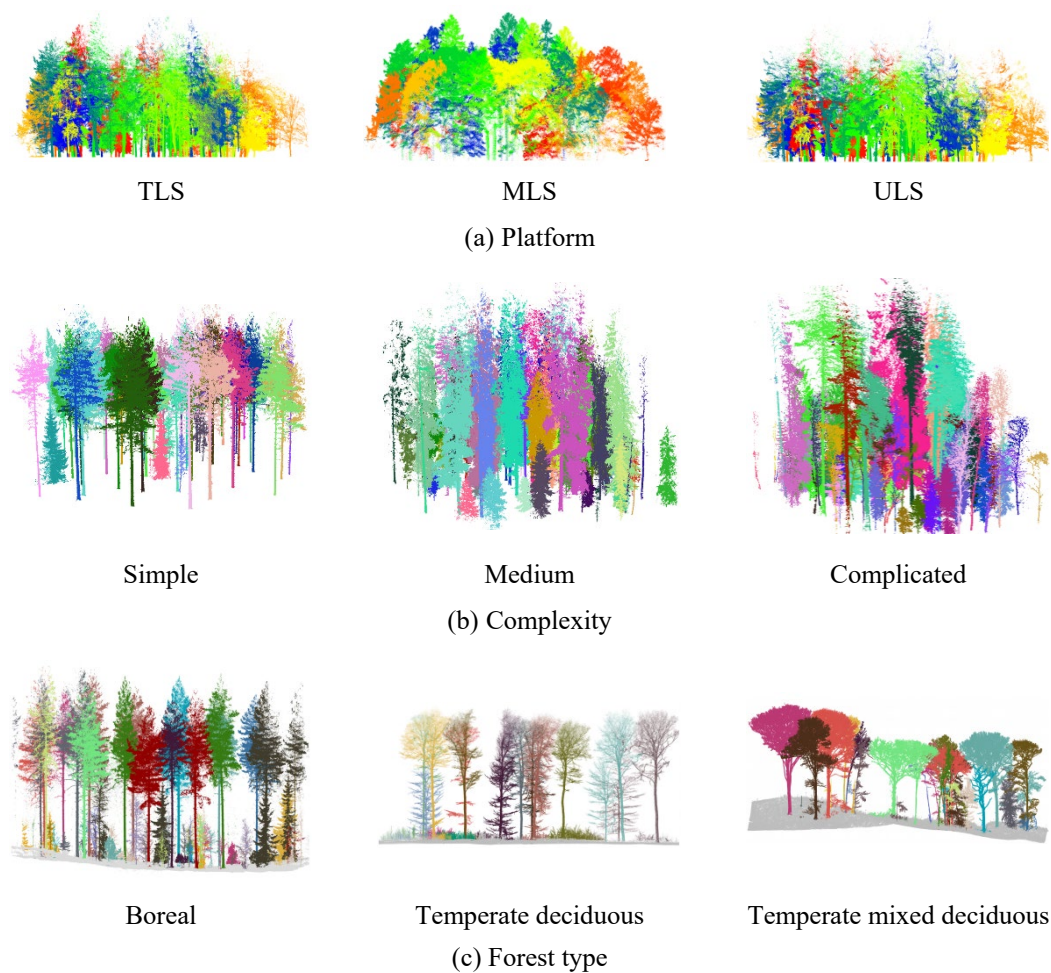


Figure 2. Example of datasets with LiDAR data and tree-level annotation, from diverse (a) platforms and with diverse (b) structural complexities and (c) forest types.

The datasets are divided into three different categories:

- Training data: to train or develop own ITD methods, provided during the Phase 1 Method Development
- Validation data: to validate own ITD methods, provided during the Phase 1 Method Development
- Testing data: to inference the ITD results using own methods to obtain a valid score/rank, provided during the Phase 2 Method Testing

4. Schedule

- Contest opening (Oct. 1st, 2025): registration begins, and the training and validation sets are released.
- Method Development (Oct. 1st, 2025 → Jan. 17th, 2026): participants may submit the 3D ITD results for the validation set for multiple rounds and monitor their real-time ranking. The training set may be updated continuously during this phase.
- Method Testing (Jan. 18th, 2026 → Jan. 22nd, 2026): the testing set will be released on Jan. 18th, 2026. Participants must submit their ITD results of the testing datasets along with a method description to obtain a valid score/rank.
- Result verification (Jan. 19th, 2026 → Jan. 25th, 2026): the top six teams from the Phase Method Testing must submit required files for verification, including project code, Docker file, and ITD results.
- Winner determination (Jan. 26th, 2026 → Feb. 10th, 2026): organizers will verify the submitted files and determine the final winners.
- Winner announcement (Feb. 10th, 2026): the final top six teams will be announced following the result check
- Award ceremony: the award ceremony will be held at an academic conference. The exact time and location are to be announced.

Note: More information about the data use and details of the data are in the Contest webpage.

The contest organizers reserve the right to adjust the timetable, tasks, terms, and arrangement as necessary based on the contest's progress.

Reference

- Liang, X., Hyypä, J., Kaartinen, H., Lehtomäki, M., Pyörälä, J., Pfeifer, N., Holopainen, M., Brolly, G., Francesco, P., Hackenberg, J., Huang, H., Jo, H.-W., Katoh, M., Liu, L., Mokroš, M., Morel, J., Olofsson, K., Poveda-Lopez, J., Trochta, J., Wang, D., Wang, J., Xi, Z., Yang, B., Zheng, G., Kankare, V., Luoma, V., Yu, X., Chen, L., Vastaranta, M., Saarinen, N., Wang, Y., 2018. International benchmarking of terrestrial laser scanning approaches for forest inventories. *ISPRS Journal of Photogrammetry and Remote Sensing* 144, 137–179. <https://doi.org/10.1016/j.isprsjprs.2018.06.021>
- Liang, X., Qi, H., Deng, X., Chen, J., Cai, S., Zhang, Q., Wang, Y., Kukko, A., Hyypä, J., 2025. ForestSemantic: a dataset for semantic learning of forest from close-range sensing. *Geo-spatial Information Science* 28, 185-211. <https://doi.org/10.1080/10095020.2024.2313325>