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Hyperspectral imaging offers new opportunities for the characterisation of forest biomaterials

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Forest biomaterials are dominated by a high level of variability, which is often difficult to measure. Hyperspectral imaging has in the last few decades spread from remote sensing and provides us tools to quantify and visualise this variability. Spectral images can now be easily recorded on hundreds of different wavelengths which are somehow related to the different chemical components of the sample or image scene.

Hyperspectral images are essentially three-way datasets that contain a full spectrum in every single pixel of an image. These pixel spectra act as a type of chemical fingerprints, which can be used for e.g. identifying different areas of the sample or determining the spatial differences in analyte concentrations through hyperspectral image regression.

In my presentation, I will introduce the principles of hyperspectral imaging and respective image analysis. By way of examples, I will demonstrate how differences in the hierarchical structure of wood can be predicted and classified on the surface and cell levels and how we can enhance the accuracy of image regression using variable selection. Finally, I will discuss some potential future developments in the fields of hyperspectral imaging and renewable forest biomaterials.