

Bioplastic made from a bacterial culture grown in a bioreactor consisting mainly of polyhydroxyalkanoate (PHA) and pressed to form a thin plastic sheet as viewed with a scanning electron microscope.

## MICROSCOPY SUITE

Scion offers a niche capability in the analysis of plant- and bio-based materials. Our suite of microscope equipment combined with world-class skills enables us to offer a uniquely specialised service.

Microscopy techniques are used extensively by Scion in the development of plant-based biomaterials. Images provide valuable insights into product characteristics and performance.

Scion offers internationally-recognised expertise in microscopy and image analysis of wood and plant fibres. This capability is used to support plant and industrial biotechnology research, as well as the development of new biomaterials.



## CONFOCAL MICROSCOPY

Confocal microscopy allows imaging of plant tissues and biomaterials in three dimensions. It is a tool integral to understanding the structure of wood and wood-based materials, fibres, plant tissues, fungi, plastics, adhesives, and paints and coatings.

Scion has a Leica TCS SP5 II high resolution spectral confocal microscope which can be used for high resolution fluorescence and reflection imaging. The instrument includes four lasers and is UV compatible (pictured at left).

Scion's confocal microscope has been used for the following applications:

- Visualising resin interfaces with fibres in composite materials.
- Demonstrating the efficacy of specific processes for composite manufacture.
- Estimating the effect of fibre dimensions on paper performance and quality.
- Understanding genetic and chemical modifications to lignin.



Viewing radiata pine cell walls using the scanning electron microscope



Harakeke fibre cell wall showing cellulose fibrils viewed with a scanning electron microscope.

## ELECTRON MICROSCOPY

Our JEOL 6700F field emission scanning electron microscope (pictured above) is equipped with secondary and backscattered electron detectors for imaging surfaces. It also has a STEM detector for transmission imaging of ultrathin sections.

This instrument is optimised for imaging of biological materials at low kV. We also have an Emitech chromium coater and a Leica ultramicrotome for specimen preparation.

## LIGHT MICROSCOPY

Our light microscope facilities include an Olympus BX61, a Zeiss Axioplan, a Zeiss polarisation microscope and a Leica stereomicroscope. All microscopes are equipped for digital imaging. Examples of application include:

- Wood identification.
- Microfibril angle.

## ANALYSIS

Our electron microscope is equipped with an X-ray spectrometer for elemental analysis and elemental mapping. This capability is primarily used to identify inorganic contaminants in products.

Image analysis software is available for various applications including a suite of 3D tools for confocal images.

### Confocal Microscopy

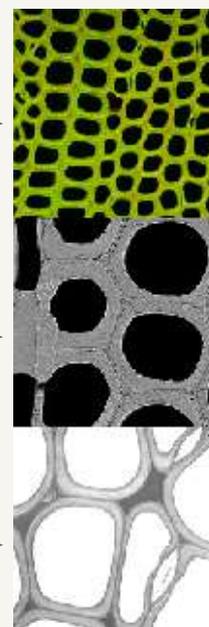
- 3D Imaging by optical slicing and projection
- Resolution ~ 400 nm

### Scanning Electron Microscopy

- 3D Imaging of surfaces by high depth of field
- Resolution ~ 5 nm

### Transmission Electron Microscopy

- 2D Imaging of thin slices
- Resolution < 1nm



## OUR SERVICES

Scion undertakes specific projects for clients, with services tailored to meet your specific needs. Services include:

- Specialised analysis of materials and problem solving for product development.
- Identifying the species of wood samples.
- Training courses in microscopy and image analysis.

### CONTACT

Dr Lloyd Donaldson  
 lloyd.donaldson@scionresearch.com  
 +64 7 343 5581  
 www.scionresearch.com