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Melbourne Advanced Microscopy

The Capability

Since its first invention in the 1200s, the microscope has made a fundamental contribution to our understanding of life and the physical world.  In particular, the last decade has witnessed a revolution based on the introduction of an amazing palette of fluorescent molecules and remarkable instrumentation developments that are transforming scientific research. Broadly categorised into three main branches; optical, electron and scanning probe microscopy, the technology premises on the diffraction, reflection or refraction of light, laser sources or electromagnetic radiation/electron beams interacting with the specimen being observed. This information is used to create an image of the specimen which can then be used to measure a range of cellular responses.

The University Platforms

Melbourne Advanced Microscopy is a large network of cross-faculty capabilities with an impressive suite of cutting-edge microscopy technology and expertise supporting a diverse range of world-class research within the University. The consolidation of this microscopy technology is reflected in four specialised platforms:

* [**BOMP - Biological Optical Microscopy Platform**](http://www.microscopy.unimelb.edu.au/)

With nodes situated within the Bio21 Institute,  and the departments of Biochemistry and Molecular Biology, Anatomy and Neuroscience and Microbiology and Immunology, BOMP provides open access to 15 contemporary fluorescent, confocal, super-high resolution and live cell imaging microscopes as well as technical training and support.

* [**Electron Microscopy**](http://www.microscopy.unimelb.edu.au/)

Located within the Bio21 Institute and the School of Botany, the Electron Microscope Platform has a range of transmission and scanning electron microscopes available to researchers as full-service or collaborative access. Instrumentation includes; FEI Quanta Scanning Electron Microscope (ESEM), FEI Nova dual beam, focused ion beam system  and FEI Tecnai F20 and F30 transmission electron microscopes.

* [**Advanced Fluorescence Imaging**](http://nanomaterials.unimelb.edu.au/)

Located within the School of Engineering, the Advanced Fluorescence Imaging node of the Materials Characterisation and Fabrication Platform (MCFP) combines cutting-edge technology in super-resolution microscopy, live cell imaging and imaging flow cytometry. Notably, the super-resolution microscopes offers the ability to resolve structures down to 20nm providing unprecedented insight into cellular and drug delivery systems while the Amnis Image Stream combines the statistical power and sensitivity of conventional flow cytometry with the spatial resolution of digital microscopy. The CyTOF combines flow cytometry with time-of-flight mass spectrometry. Through the use of heavy metal ion tags instead of fluorochromes, the CyTOF allows for many more parameters to be investigated in a single experiment with minimal signal overlap. This platform has specialised expertise in applying this technology to nano-research, drug delivery and materials science.

* [**Nanomaterials Characterisation**](http://nanomaterials.unimelb.edu.au/)

The nanomaterials characterisation node of the MCFP operates what is currently the leading world-class atomic force microscopy (AFM) facility in Australia with considerable expertise in both direct force measurement and surface imaging and characterisation to analyse the roughness, topography or particle size of your samples. Located in the School of Engineering, the facility supports a number of internal and collaborative research projects, providing equipment access and technical support for AFM, nanoindentation and contact angle instrumentation.

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