

MacroPhor™ Array

The MacroPhor™ Array is the next generation of the MacroPhor™ analytical hyperspectral imaging system. The original MacroPhor™ provided fluorescence imaging at the macroscopic level, accommodating samples up to 4-inches in diameter. Versatile for imaging samples contained within Petri dishes, well plates or samples placed directly onto the sampling platform, the MacroPhor Array takes this macroscopic imaging approach to a new level with the ability to combine multiple imaging modalities (cameras) and the ability to automatically image up to twenty-one different samples at a time.

Easy Set Up

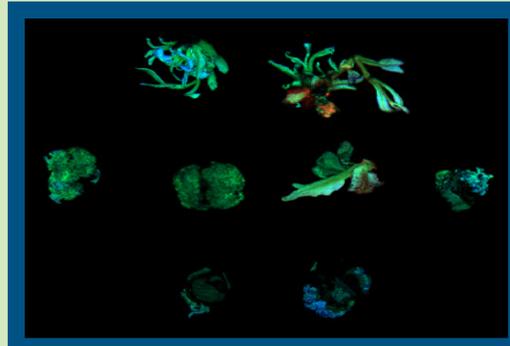
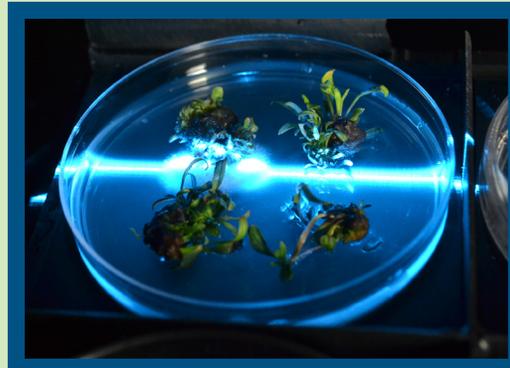
The MacroPhor™ Array features a large sample stage that can hold a variety of samples such as plant and plant materials, yeast colonies, drill core, minerals and other products derived from organic components. The system supports a large sample tray that can hold up to twenty-one samples (e.g. Petri dishes, well plates, custom trays) that can be scanned in succession. An intuitive software interface provides an easy setup of the 3 unit x 7 unit sample array (full tray size is 11.75" x 27.25"). The user can select any combination of the sample positions to acquire data from. The software allows selection of one or both cameras for image acquisition. The ability to acquire data with multiple hyperspectral imaging modalities can supply complimentary and independent information about the sample.

In plant research, for example, information about the photosynthetic pigments can be extracted using fluorescence imaging, while information about the compartmentalization of water within the plant tissues can be obtained using Near Infrared (NIR) imaging. This complimentary information is useful for plant phenotyping.



The Power of Hyperspectral Imaging

Single point spectroscopic measurement instruments are capable of producing high quality spectra which are critical to understanding or solving problems presented to the lab. This helps to resolve questions like "What is it?" and "How much is there?" These techniques can be cumbersome to use and relatively uninformative with respect to non-uniformities



when looking at the entire area of a sample or product. Using a hyperspectral camera, an image of the whole sample area can be captured and interrogated quickly to understand data from the entire sample. A hyperspectral image contains a full spectrum for each pixel in the image. This can be extremely useful for identifying pure components, monitoring uniformity across a sample, looking for contaminants or quantitative measurements of sample components.

Big Data Output, Powerful Software

The MacroPhor™ Array produces large data sets which can be overwhelming to the casual user, however we have developed an image analysis software package (KemoQuant™) that can quickly reduce the data into quantitative and meaningful results. KemoQuant™ uses multivariate spectral analysis techniques to discover/identify the independently varying spectral components present within the hyperspectral images and quantify the amount of these spectral components present in each pixel. The software provides the statistical output of the full twenty-one-sample array, as well as a breakdown of statistical output for each sample using a pre-defined grid pattern (e.g. 21 sample positions). The full spectrum analysis techniques provided by KemoQuant provide the greatest possible measurement sensitivity and specificity necessary for solving difficult problems.



An Array of Wavelength Options

The MacroPhor™ Array can be configured with up to two Hyperspectral cameras. The system can be configured for broad range imaging or hyperspectral fluorescence imaging. Camera combinations include the following:

	Camera 1	Camera 2*
VNIR & NIR	VNIR 400-1000nm	NIR 900-1700
VNIR & SWIR	VNIR 400-1000nm	SWIR 1000-2500
Fluorescence & NIR	Fluorescence - 400-800nm Laser wavelength options, 405nm, 488nm, 532nm, 640nm	NIR 900-1700
Dual Fluorescence	Fluorescence - 400-800nm Laser wavelength options, 405nm, 488nm, 532nm, 640nm	Fluorescence - 400-800nm Laser wavelength options, 405nm, 488nm, 532nm, 640nm

* MSV offers other systems integrating any/all of the four cameras above plus MWIR and LWIR cameras for measuring the samples in sequence.

