HinaLea 4200M Microscope System

The HinaLea Model 4200M Microscope System is a peripheral device that adds hyperspectral imaging functionality to microscopes. This system enables observation and spectral analysis of nanoscale samples in a variety of biological and materials-based environments.

HIGHLIGHTS

- High spatial and spectral resolution
- True hyperspectral microscope camera
- VIS-NIR (400 – 1000 nm)
- 300 spectral band-passes nominal, up to 600 maximum
- 5 nm (FWHM)
- < 1 nm repeatability
- Inter-band switching down to 2 ms
- Software configurable spectral bands
- Standard C-mount interface

Hyperspectral Imaging in Microscopy

Hyperspectral imaging offers substantial benefits for microscopists in the life sciences field, allowing for the:

- Concurrent imaging and localization of a large number of targets
- Simplification of multiplexed imaging by utilizing a single excitation source with multiple fluorophores which are identified via their spectral signature
- Tracking of the localized microenvironment of fluorophores by means of imaging of Stokes shift distributions across regions in a sample

Benefits of HinaLea's 4200M Microscope System

HinaLea's 4200M Microscope System offers significant benefits over existing multi/hyperspectral microscopy systems.

Full Spectrum Coverage: Current multispectral microscopy cameras offer a limited number of spectral channels, with a reduced spatial resolution. This is a direct consequence of their architecture which uses a color filter array (CFA) on a focal-plane imaging array. Other grating-based hyperspectral microscopy cameras require mechanical scanning of the sample and are therefore expensive and require periodic calibrations. The HinaLea 4200M Microscope System is the only staring hyperspectral microscopy system on the market which can scan the whole VIS-NIR system with high spatial and spectral resolutions at an affordable price.

Wavelength Selectivity: One of the unique attributes of the HinaLea 4200M Microscope System is its wavelength selectivity. In many microscopy imaging applications, a subset of spectral bands can be selected from the hyperspectral data-cube to maximize the information retrieved from each scan. Typically, this subset is dependent on the set of dyes used as well as on the type of sample being interrogated. Since multispectral cameras as well as grating-based hyperspectral scanning cameras have their spectral bands "hard-wired", either by a CFA or by a grating coupled to a focal-plane array, the benefit of determining this subset of bands is lost. A complete data-cube must be retrieved, or a complete mosaicked multispectral image must be processed, regardless of how few bands are really needed. The HinaLea 4200M Microscope System can be programmed to scan only a subset of wavelengths and thereby scans can be shorter and generate smaller data sets – all beneficial for the user, especially in high-throughput applications.

HinaLea 4200M Microscope System Technical Specifications

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» **Staring Hyperspectral Imaging**
No mechanical scanning is required, resulting in a lower-cost, reliable system.

» **Off-Sensor Spectral Filtering**
Decoupling the spectral filtering from the image sensor enables achieving very high spatial resolution, or lower resolution at a lower system cost, with minimal redesign.

» **True Hyperspectral Imaging**
Unlike color-filter arrays, with the HinaLea solution, there is no tradeoff between number of spectral bands and effective spatial resolution.

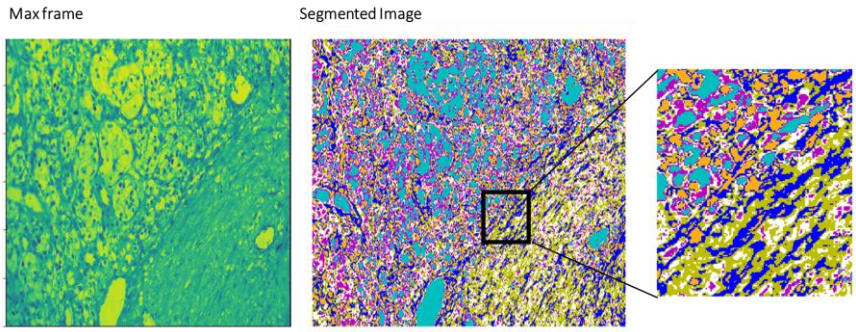
» **Customizable**
HinaLea will work with strategic partner to optimize camera performance for specific application and will consider OEM models.

Mechanical	
Dimensions (LxWxH)	230mm x 120mm x 200 mm
Weight	1.4 kg (optical head only)
Electrical	
Input Voltage	18 VDC (optical head only)
Data Interfaces	USB 3.0 and 2
Environmental	
Operating Temperature (Non-condensing)	20°C ± 5°C
Storage Temperature (Non-condensing)	0°C to 40°C (32°F to 104°F)
Humidity (Non-condensing)	65% maximum
Scan Performance	
Sensor Spatial Resolution	2.3 MP with demosaicing
Dynamic Range	User selectable 8 or 16 bit
Spectral Range	400 – 1,000 nm
Max Number of Spectral Bands	300 nominal, 600 maximum
Spectral Resolution	4 nm (FWHM)

+ RGGB sensor; effective monochromatic equivalent 588,544 pixels without demosaicing

The application software features easy and fast data cube capture and intuitive image classification/segmentation as part of a suite of powerful spectral image exploration tools.

Sample Image: On the left is a maximum frame image (false colored green) of the lung cancer tissue collected with the HinaLea hyperspectral microscope system under 10X magnification with quartz tungsten halogen lamp illumination. Pixel groupings are similar spectral profiles (false colored), and cluster centers can be considered the endmembers or representative spectra.



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