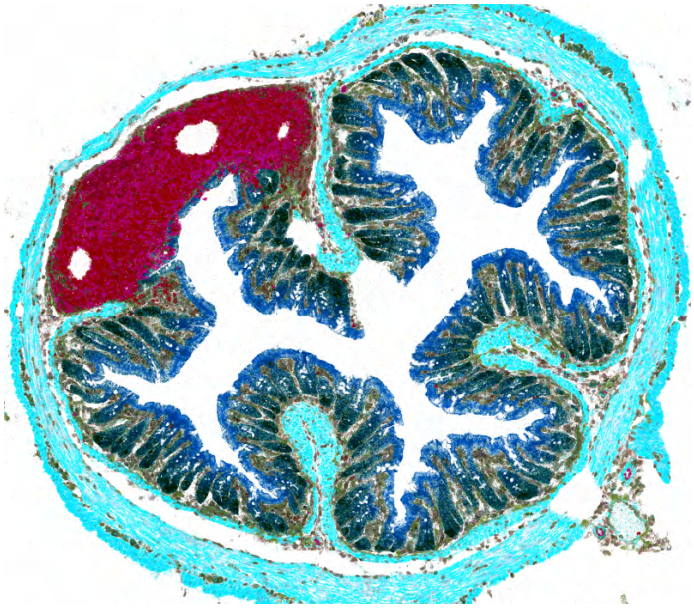




Bright, Stable Laser for MERFISH? Choose CELESTA Light Engine

Lumencor's CELESTA Light Engine for MERFISH is a high-performance, multi-line laser illuminator optimized for demanding spatial biology applications, including MERFISH (Multiplexed Error-Robust Fluorescence *In situ* Hybridization). CELESTA's compact architecture integrates numerous independently controlled solid-state lasers in a turnkey subsystem, providing the optical power, stability, and brightness required for highly multiplexed fluorescence imaging. Lumencor has strategically increased CELESTA optical output power for MERFISH workflows, supporting applications where high irradiance and efficient excitation are essential for rapid acquisition of large, information-rich datasets and images.

When paired with Lumencor's Critical Epi-Illuminator, CELESTA delivers intense light across a large field of view while maintaining the spatial uniformity required for quantitative imaging. This combination of brightness and field uniformity is critically valuable for MERFISH, where consistent excitation across thousands of observation fields and repeated imaging cycles directly supports reliable detection and reproducible measurements. CELESTA is equipped with a 400 µm cross section optical fiber to a custom Critical Epi-Illuminator, providing a practical route to efficiently translate CELESTA's laser output into uniform widefield excitation at the target specimen. Lumencor Critical Epi-Illuminators are available for many common microscope frames, please inquire.

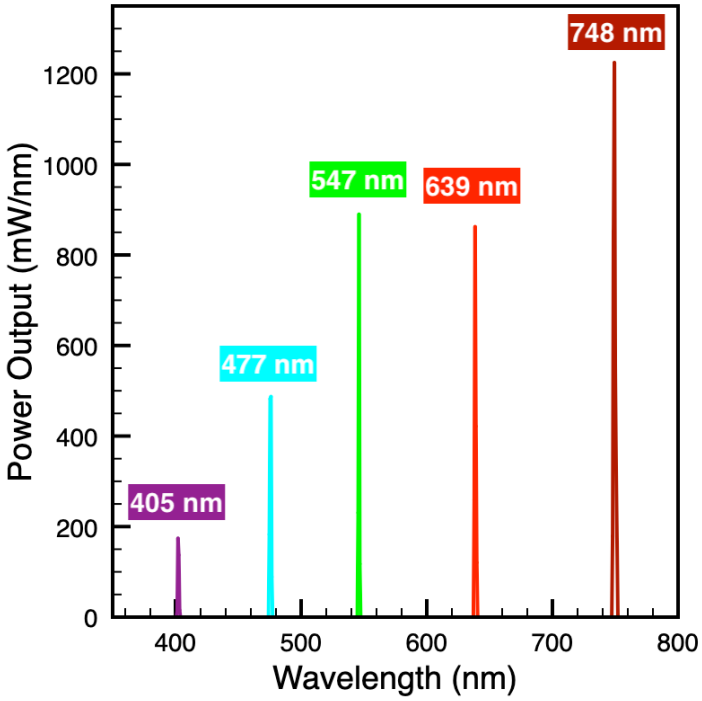
The result is an illumination solution designed to assist MERFISH users as they balance speed, sensitivity, uniformity, and system simplicity. CELESTA demands the least performance tradeoffs with regard to lighting. Fiber-coupled delivery simplifies integration with advanced fluorescence microscopes while separating the illumination source from the microscope platform, and independent solid-state lasers provide precise control of multicolor excitation for the often complex workflows they support.

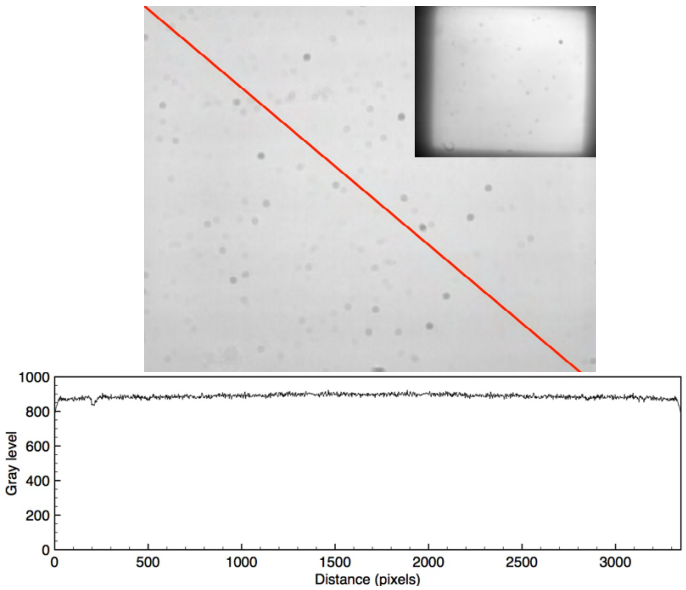
Beyond MERFISH, CELESTA services other demanding fluorescence techniques, including STORM, PALM, PAINT, and high-content spatial imaging, making it a versatile illumination subsystem for laboratories developing next-generation spatial biology and single-molecule imaging techniques.

CELESTA controls are implemented in several commonly used image acquisition software packages. TTL triggering is available for applications requiring fast (100 microseconds) switching time. Do you have an application demanding bespoke lighting? Perhaps CELESTA can help!

OEM customization is available upon request. To receive a quotation for a CELESTA Light Engine, please submit an online quotation request form.

CELESTA Light Engine for MERFISH Spectral Output





Uniform fluorescent glass imaged with a CELESTA Light Engine for MERFISH with a Critical Epi-Illuminator using a Nikon 60X/1.4 NA PlanApo objective. The plot shows the gray level values recorded by the camera along the diagonal axis marked in red. The inset in the upper right hand corner shows the same sample imaged with a Nikon 10X/0.3 NA PlanFluor objective.

Features and Operating Characteristics:

Features	Details
Sources	Five (5) solid-state, class 4 lasers with despeckler
Wavelengths	Center wavelengths 405, 477, 547, 639, 748 [1]
Bandpass Filters	Integrally installed bandpass filters
Output Power	~200 mW (V), ~750 mW (C,G), ~1000 mW (R) and ~2000 mW (N) distal end of optical fiber
Light Delivery	400 µm FC/PC-terminated optical fiber [2]
Safety Interlocks	Manual (key), remote (electronic) and software interlocks [3]
Control Interfaces	Source selection, light output on/off and intensity via serial interface (RS-232/USB or ethernet). Source selection and light output on/off via TTL.
Software	Onboard GUI or PC-based image acquisition software
Onboard Metrology	Real-time power, cumulative laser on-time, internal temperature, humidity, dew point [3]
Optional Accessories	(1) Critical Epi-Illuminator (2) 9-channel breakout cable for TTL triggering
Power Requirements	100-240 V AC, 50-60 Hz. DC power supply (220 W, 24 V/9.2 A) and AC cord included
Dimensions (W x L x H)	145 mm x 340 mm x 203 mm (5.7 in x 13.4 in x 8.0 in)
Weight	9 kg /19.9 lbs
Warranty	24 months, warranty extension options available

[1] Output wavelengths ± 3 nm.
[2] Optical fiber included with Light Engine purchase.
[3] Interlock status and metrology readouts displayed in onboard control GUI.