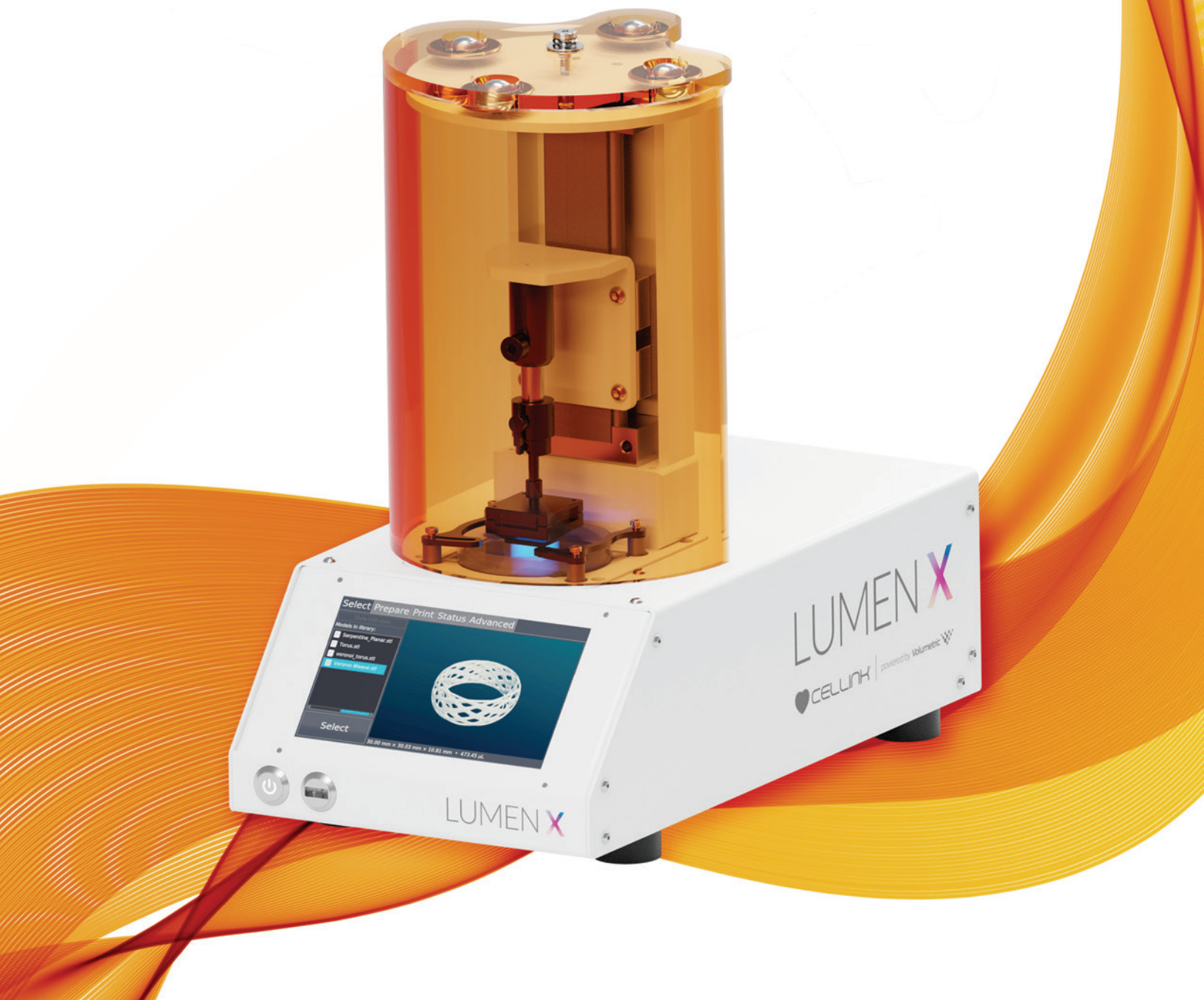
LUMEN X

CELLINK® | powered by Volumetric

Construct microscopic features with speed, fidelity and precision.

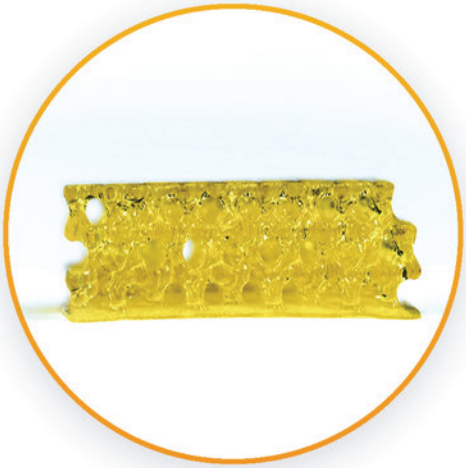
Lumen X, powered by Volumetric, offers high resolution, high throughput and high fidelity to enhance your applications in microfluidics, cell-laden hydrogels, macroporous structures and more. Designed to bioprint vasculature with UV light, Lumen X gives you a powerful advantage in achieving complex branching and tapering of vessels.

Lumen X is being launched through an exciting partnership with CELLINK and Volumetric, a Texas-based startup. We've combined expertise to optimize the technology for all of your bioprinting needs.



• Leverages more than 1 million simultaneous points of light to bioprint microscopic features down to 200 microns.

• Photographically cures entire layers at once to crosslink structures 50 times faster than other printing methods.



• Complements the state-of-the-art capabilities of CELLINK's BIO X system. You can use BIO X to print living cells within a Lumen X-fabricated structure and strengthen your work in applications like organ-on-a-chip and multimaterial research.

PEGDA

Volumetric's PEGDA PhotoInks™ are advanced, biocompatible and nonbiodegradable bioinks designed specifically for the Lumen X.
After printing, incubate PEGDA PhotoInk™-printed hydrogels in PBS or MilliQ. Be sure to use sterile MilliQ if you are printing with cells. Change PBS/MilliQ at least three times in the following 24 hours – this enables the hydrogel to reach equilibrium and will result in mostly transparent hydrogels.
Only for use on the Lumen X. Not for use on BIO X, INKREDIBLE or INKREDIBLE+ bioprinters.

PEGDA200

PEGDA200 PhotoInk™ is ideal for flexible, gas-permeable microfluidic devices that contain intricate vascular architectures, static microfluidic mixers, as well as for use as a macroporous scaffold. PEGDA200 is optically clear and can be expected to swell 91% by weight in water.

PEGDA500

PEGDA500 PhotoInk™ is ideal for rigid macroporous scaffolds, static microfluidic mixers and drug delivery devices. PEGDA500 is optically translucent and can be expected to swell by 33% by weight in water.

PEGDA

PEGDA PhotoInk™ is ideal for soft, gas-permeable microfluidic devices that contain intricate vascular architectures, static microfluidic mixers, as well as for use as a macroporous scaffold. PEGDA is optically clear and can be expected to swell 150% by weight in water.

PEGDA Start

PEGDA Start is a draft PhotoInk™, perfect for testing new geometries and learning to use Lumen X. PEGDA Start has not been validated for cell biocompatibility. PEGDA Start is optically opaque and can be expected to swell 12% by weight in water.

GelMA

Volumetric's GelMA PhotoInk™ is an optimized gelatin-based biodegradable bioink designed specifically for the Lumen X. GelMA PhotoInk™ can be mixed with a cell pellet before printing, and provides mammalian cells embedded in the fabricated hydrogel with the essential properties of their native environment. Lumen X's built-in heating function is crucial for generating complex GelMA-based hydrogels.

Using 405-nm near-UV light exposure, Volumetric's GelMA PhotoInk™ enables materials to cure with little-to-no impact on cell viability. To incorporate mammalian cells into GelMA PhotoInk™, you can gently mix the bioink with a cell pellet. Additionally, this material can resolve intricate vascular networks and channels when coupled with the Lumen X, which can be seeded with endothelial and epithelial cells.

After printing, incubate GelMA PhotoInk™ printed hydrogels in warm (37-degree Celsius) PBS solution. Change the PBS at least three times in the following 24 hours – this enables the GelMA hydrogel to reach equilibrium and will result in mostly transparent hydrogels. When printing cells with GelMA PhotoInk™, incubate the printed hydrogel in the appropriate sterile cell culture media at 37 degrees Celsius.

Only for use on the Lumen X. Not for use on BIO X, INKREDIBLE or INKREDIBLE+ bioprinters.

Lumen X Light Meter

Volumetric's Light Meter is used to precisely measure light intensity and reliably set the ideal power output when printing with the Lumen X.

The Light Meter contains a probe specifically for the Lumen X's biologically compatible 405-nm wavelength output. While you don't need to measure the light intensity for every single print, we highly recommend checking power output at the start of each print session.

Lumen X vats

Volumetric's vats are lined with a proprietary silicone formula to enable gentle separation of cured PhotoInk™ layers while printing with the Lumen X.
Although designed to be disposable after each print, you can rinse your used vats with 70% IPA or ethanol for multiple prints. When printing larger objects, a fresh vat is highly recommended to optimize printability. We don't recommend reusing vats if you embedded mammalian or bacterial cells in the PhotoInk™ because this can compromise the vat's sterility and cleanliness. For best results, use a fresh vat after printing with PhotoInk™.
Available in sterile packaging for bioprinting with cells in a biological safety hood.

Lumen X Build Platform

Volumetric's Build Platforms are the substrates onto which Lumen X prints adhere.
The slide-and-latch mechanism enables easy removal and installation of a fresh platform for nearly uninterrupted, sequential printing. You can easily sterilize Build Platforms as well – just submerge it in 70% ethanol and dry. To dry the Build Platform, gently blow inert gas or leave the platform upright for 30 minutes.
Available in glass and metal bottom varieties. The variety you should use is dependent on the PhotoInk™ used; glass variety is recommended for hydrogels and metal variety is recommended for resins).

Technology and hardware

Projection stereolithography
>1 million simultaneous points of light
Projected image: 1280 x 800 pixels
Pixel resolution (XY): 50 µm
Z-precision (motor-driven): 5 µm
Max build volume:
64 x 40 x 50 mm (Metal platform)
40 x 25 x 50 mm (Glass platform)

Projected light

Biocompatible wavelength: 405 nm
Intensity range: 10 – 30 mW/cm^2
Distortion: <1%

Additional features

Disposable, quick-change sterile vats
Heated platform: Up to 37° C

Software

Seamless, intuitive workflow
Capacitive touch interface
Compatible file type:
STL (stereolithography file)
Electrical power input:
100 – 265 VAC,
50 – 60 Hz, 100 W

Size and weight

Dimensions: 24 x 43 x 41 cm
(9.5 x 17 x 16.5 in)
Weight: 9 kgs (20 lbs)

*Voronoi braid (on touchscreen)
courtesy of artist O3D, CC-BY licensed.

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