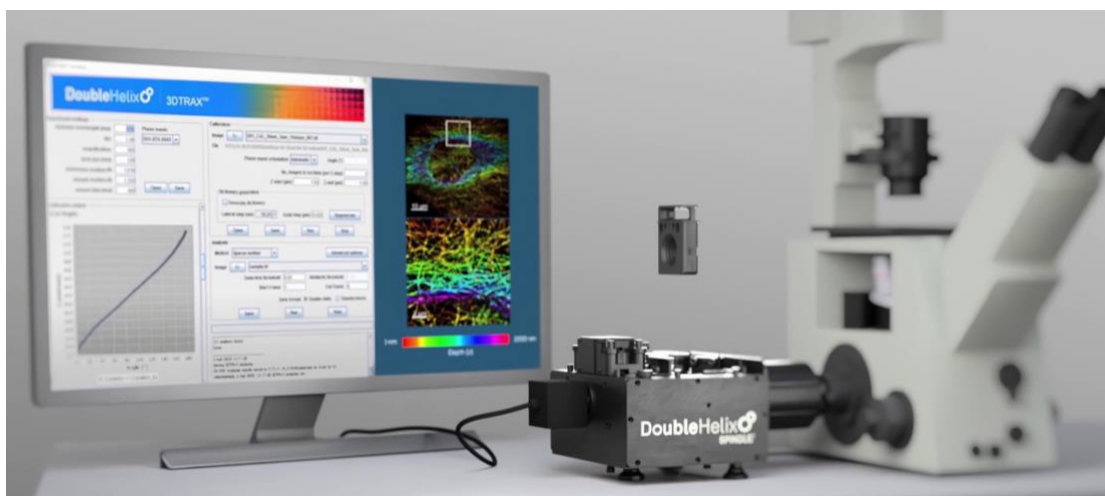


SPINDLE²: DUAL-CHANNEL MODULE FOR HIGH-RESOLUTION, EXTENDED-DEPTH 3D IMAGING, TRACKING, AND COUNTING

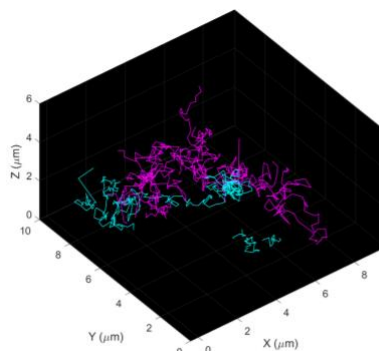
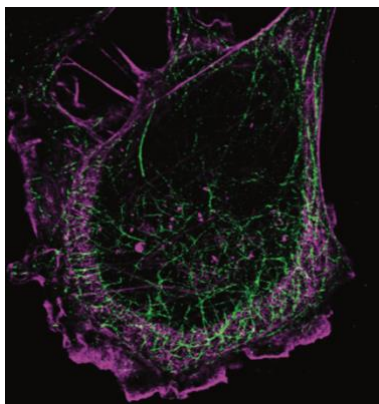
Integrating Double Helix Optics' engineered point spread function (ePSF) technology, the dual-channel SPINDLE²™ module offers a streamlined path to instantaneously upgrade a standard 2D microscope into an advanced 3D nanoscale imaging system with simultaneous multichannel capture using a single camera.

SPINDLE² features a **compact form factor**, **interchangeable ePSF phase masks**, **integration with 3DTRAX[®] image processing and analysis software**, and **the ability to attach between most scientific optical microscopes and cameras**. It is compatible with DHO's full library of depth-tuneable phase masks, making it suitable for a broad range of applications, including 3D single-molecule localization microscopy, 4D single-particle tracking, and 2.5D spatial omics. Moreover, with bypass mode, the base imaging capabilities of the microscope are accessible as needed and with single-channel mode, the full area of the camera sensor can be used with one channel.

SPINDLE² has no electrical components, no software drivers, and easy hardware alignment, leading to robust long-term performance with minimal maintenance needs.



SPINDLE seamlessly slots into a microscope's optical path between the body of the microscope and the camera. It has no electrical components, leading to minimal need for maintenance once aligned.



Left: 3D super-resolution reconstruction of kidney cell microtubules captured by the SPINDLE². Leveraging the dual-channel capabilities of the module, imaging targets tagged with two different fluorophores were simultaneously captured by the camera.

Right: Simultaneous multicolor 3D tracking of microspheres.

TECHNICAL SPECIFICATIONS

Phase mask compatibility	All DHO phase masks: 3D ePSF (Double Helix, Single Helix), Deep Focus ePSF, single-channel mode to use full camera sensor with one channel, bypass mode for clear-aperture imaging in one or both channels
System integration	Compatible with widefield, epi, TIRF, HILO, light sheet; attach with standard C-mount to optical microscope or confocal system with bypass mode
Dimensions	240-300 mm (depending on alignment) x 195 mm x 130 mm
Field of view	Up to 18 mm diagonal in single-channel mode. FOV is divided in half when using dual-channel mode.
Transmission efficiency	>95%
Objective lens compatibility	Wide compatibility for high and low magnifications and numerical apertures, and all immersion media
Example application areas	<p><u>Life Sciences</u></p> <ul style="list-style-type: none">3D super-resolution imaging4D live-cell imaging and trackingExtended-depth spatial omics <p><u>Inspection</u></p> <ul style="list-style-type: none">3D surface metrologyExtended-depth inspectionInspecting curved or out-of-plane samples <p>Simultaneous multicolor or multimodal combinations of the above.</p>