



Kinetix Scientific CMOS Camera

CUSTOMER REFERENCE

DeepSIM Super-Resolution

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BACKGROUND

CrestOptics is a leading company in the development and manufacture of advanced systems for fluorescence microscopy, featuring products such as the X-Light series of spinning-disk confocal modules. CrestOptics has also recently launched DeepSIM, a super-resolution module for 3D samples. We discussed DeepSIM with Head of Sales and Marketing Dr. Scarpellini, and Application Specialist Dr. Giubettini.

Dr. Scarpellini told us more, "We noticed an increase in demand for higher resolution to see more of biological samples, but many options for super-resolution imaging were not accessible due to high cost, specialised sample preparation, or incompatibility with live sample imaging. This is why we developed DeepSIM, which makes super-resolution accessible, similar to how we made spinning-disk accessible. You can work with the same sample you'd typically use, but in a variety of configurations, such as combining DeepSIM with a spinning disk confocal or as a standalone, on upright or inverted microscopes, and able to work with a full range of objectives."

Dr. Giubettini expanded on the possible imaging configurations, "It's super easy to change between three modalities: widefield, spinning disk and DeepSIM, you can switch to SIM to go into more detail on a sample, all while working with the same sample preparation."

“The Kinetix is a camera we like a lot with our spinning-disk systems because of the speed and large field of view, this also makes Kinetix a very good choice for DeepSIM.”

CHALLENGE

Dr. Scarpellini told us what DeepSIM needs from a camera, "a pixel size of 6.5 μm , good hardware triggering options, and as much speed as we can get, because we need to acquire multiple frames to get one super-resolved image. So low readout time and high speed is important to us, along with high sensitivity."

DeepSIM requires a camera that can image at high speeds while maintaining good signal-to-noise ratio at low exposure, along with a 6.5 μm pixel. In addition, when the DeepSIM is combined with the X-Light V3 spinning disk, the maximum field of view increases to 25 mm, requiring a camera with a suitably large sensor.

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The Kinetix sCMOS is an ideal solution for CrestOptics' advanced imaging systems such as the X-Light V3 spinning disk and DeepSIM modules, thanks to the unique combination of high acquisition speed, high sensitivity and 6.5 μm pixels across a 29 mm sensor. For an example of live cell imaging with the Kinetix and DeepSIM, please refer to application notes [from the CrestOptics website](#).

SOLUTION

Dr. Scarpellini described her experience with the Kinetix, "The Kinetix was already a camera that we liked a lot with our X-Light V3 spinning-disk systems, because of the speed and wide field of view. This also makes the Kinetix a very good choice when combining the spinning-disk with DeepSIM."

"For the standalone DeepSIM our recommendation for users who need the highest possible speed is to use the Kinetix22, but some users might also be happy with the Prime BSI Express as well."

REFERENCES

<https://crestoptics.com/deepsim/>

<https://crestoptics.com/x-light-v3/>

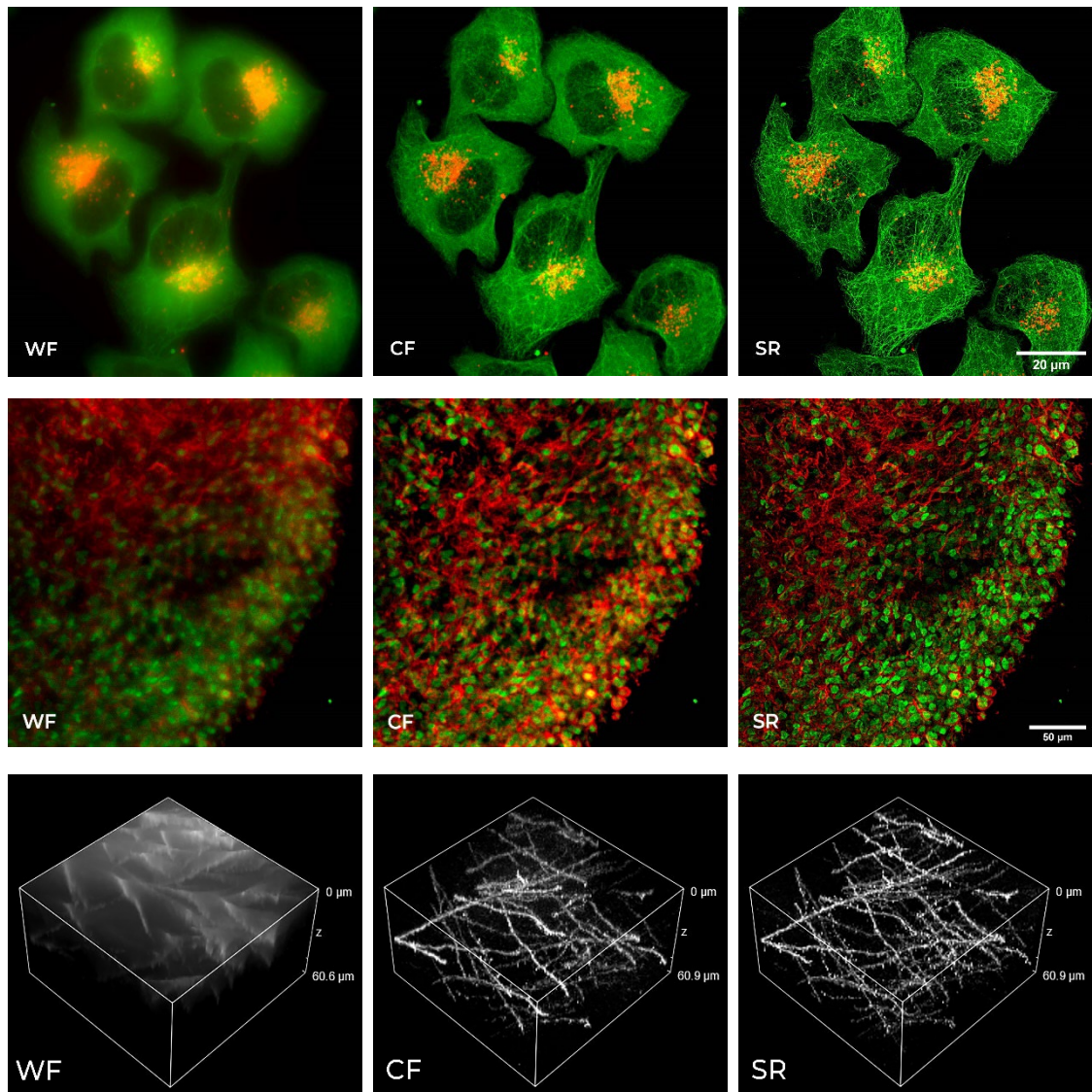


Figure 1: Comparison of widefield (WF), X-Light V3 spinning-disk confocal (CF) and DeepSIM super-resolution (SR) images, all acquired with the Kinetix sCMOS. Top row is HeLa cells at 60x (GFP-alpha tubulin in green, lysosomes in red), middle row is human brain organoids at 20x (CTIP2-positive deep layer cortical neurons in green, pan-neuronal MAP2 in red), bottom row is 60 μm thick 3D volumes of mouse brain tissue. Thanks to the Consiglio Nazionale delle Ricerche (CNR) for HeLa samples, and Istituto Italiano di Technologie for brain organoid samples.