

SRRF-Stream⁺ - Real-time live cell super-resolution microscopy just got even better

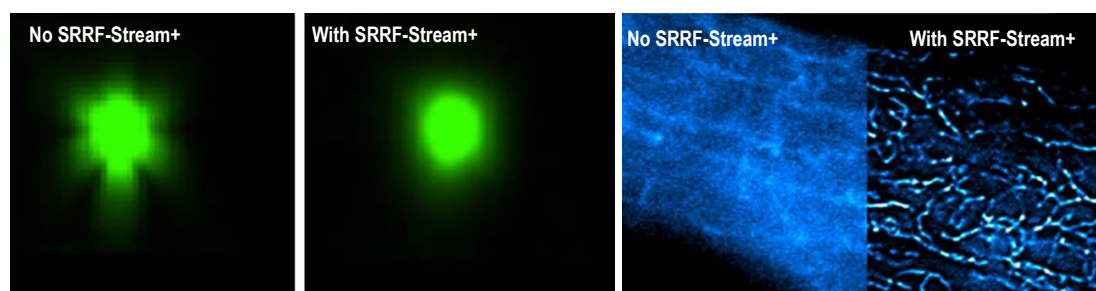
DR ALAN MULLAN

Product Specialist for Microscopy Cameras at Andor Technology

Much of the structure and processes of the cell are masked from view below the classical diffraction limit of light-based imaging microscopy. Super-resolution techniques such as STORM, PALM, STED and SIM have smashed past this barrier and enable cell biology to be studied in considerably more detail.

There are some limitations to these techniques: costly equipment, high illumination intensities or need to use specialised fluorophores. SRRF (Super-resolution Radial Fluctuations) offers an alternative approach that counters many of these limitations (Gustafsson *et al* 2016). Of particular interest, it allows for super resolution at low illumination intensities, using standard fluorophores on a conventional microscope. One development of SRRF is SRRF-Stream. This version is exclusive to Andor Technology and optimizes GPU processing to unlock real-time live super-resolution from a microscope. Since its introduction SRRF-Stream has proven to be popular on both the Dragonfly multi-modal confocal systems as well as standard widefield microscopes.

We now present an updated version of SRRF-Stream called “**SRRF-Stream⁺**” which allows for improvements in image quality. This has been achieved by improving the radially step used during localisation processing. We also demonstrate SRRF-Stream⁺ works very effectively on the Andor Sona back-illuminated sCMOS camera series – previous versions of SRRF-Stream having been restricted to iXon EMCCD cameras only. These latest developments add to the previous benefits of SRRF-Stream that made it popular, making it an even more flexible and useful tool in the microscopists’ imaging toolbox.



Left: The improved radially processing of SRRF-Stream⁺ provides a more effective and better image quality compared with previous versions. **Right:** Even a challenging sample of the weakly labelled microtubule network of cardiomyocytes under widefield imaging (60x) becomes revealed using SRRF-Stream⁺ and the high-performance Sona 4.2B-6 camera.