# Cell Motility

**An overview of Andor's solutions for Cell Motility**

Cell motility is required for many important physiological processes during development, such as cell migration during gastrulation, axon guidance, tissue regeneration and embryological development. Unregulated cell migration can be the cause for progression of cancer, e.g during metastasis. The challenge to perform rapid, multi-dimensional imaging of motile cells is fundamental to our understanding of above mentioned processes.At the level of single cell visualization, cell motility envelopes a broad area of study including the mechanisms of cell migration, chemotaxis, axon guidance and motility of dendritic spines. Of interest are whole cell movement, cell polarity, adhesion, membrane ruffles, protrusion of lamellipodia and filopodia, morphogenesis and also the involvement of the cytoskeleton, particularly at the leading and trailing edges of locomotion. Historically the microscopy of motile cells has, from the instrument standpoint, been marred by the need for greater speed and sensitivity at high resolution. For example, it can be desirable to image rapid protrusion of lamellipodia and filopodia.It can also be fundamental to visualize the cytoskeletal dynamics and membrane morphology of moving cells with high resolution and sensitivity, such that the underlying mechanisms of protrusion and retraction can be understood in the context of the interactions and growth of actin (e.g. stress fibers), mictrotubule and intermediate filament cytoskeletons.Underlying all direct imaging studies of living cells or organisms, is the desire to preserve the living subject for as long as possible, through minimization of both phototoxic cell/tissue damage and photobleaching of the incorporated fluorophores.

The iXon3 EMCCD Camera has provided the solution to the challenges described above, enabling high resolution, high signal-to-noise (S/N) movies to be acquired of cell systems and their chemotactic response, without sacrificing any of the critical imaging parameters. Furthermore, through reducing the excitation power, phototoxic effects are minimized, enabling cells to be followed for much longer periods. These cameras are also the perfect partner to live cell confocal solutions such as Revolution XD and Revolution WD.

iXon and Luca imaging EMCCD platforms each display single photon sensitivity combined with high Quantum Efficiency (QE) at multi-MHz rapid readout speeds.