



HIGH PERFORMANCE EMCCD & CCD
CAMERAS FOR LIFE SCIENCES



CUSTOMER REFERENCE

Evolve™ 512 EMCCD Camera, DV2 Multichannel Imaging System

Single Molecule and TIRF

Dr. Steven Magennis

The University of Glasgow, School of Chemistry

BACKGROUND

The School of Chemistry has a long history of excellence in both research and teaching. It maintains a superb research environment with world leading research groups and facilities. The School supports a wide variety of research topics, from all aspects of Chemistry, as well as interfaces with biology, materials science and physics.

Dr. Magennis and his team focus on single-molecule techniques, looking for ways to reveal details about molecular systems that are otherwise obscured by conventional ensemble methods. They use powerful tools for the study of systems that cannot be synchronized, display static or dynamic heterogeneity, have transient intermediates or undergo rare events. Underlying themes in their research are the use of single molecule spectroscopy and imaging to probe the structure, dynamics and reactions of biomolecules, and the development of new tools using ultrafast lasers.

CHALLENGE

Due to the sophisticated nature of their research, the team needed to ensure reliable detection of single molecules in their imaging process. Intrinsically weak signals and interference from background sources of scattering and fluorescence make imaging a challenge and difficult to achieve. Of highest importance was the need for good signal to noise capability.

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In addition to the inherent benefits of the camera's EMCCD technology, the team has also benefitted from the camera's integration with third party software that are used for their image analysis. The Photometrics Technical Support team has also been very responsive and helpful when they were needed. “We’ve been very happy with both the camera's performance and the excellent technical support provided by Photometrics,” stated Dr. Magennis.

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SOLUTION

The team successfully used the Evolve 512 for a number of years for prior research. They were happy to continue using the Evolve as their camera of choice. They also implemented the Photometrics DV2 multichannel system. The DV2 is an emission splitting system enabling a user to acquire two spatially identical but spectrally distinct images simultaneously.

Dr. Magennis shares "In combination with total internal reflection fluorescence (TIRF) microscopy, the Evolve 512 has allowed us to routinely detect and analyze the fluorescence from single molecules, providing long-time dynamic information on immobilized molecules and particles."

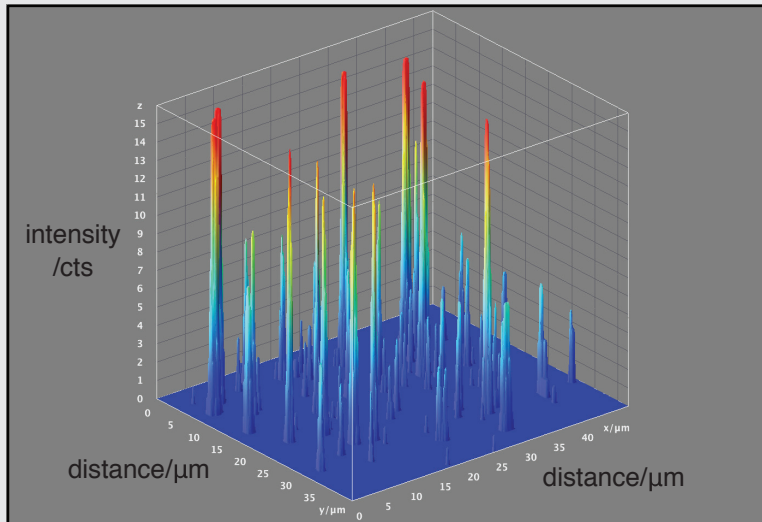


Figure 1: Multiphoton TIRF microscopy of immobilised CdSe/ZnS quantum dots

(see Lane et al.
Optics Express, 2012,
Vol. 20, p 25948-25959)

Additional information about the University of Glasgow, School of Chemistry is available at:
<http://www.gla.ac.uk/schools/chemistry/>

Published research, *Signal enhancement in multiphoton TIRF microscopy by shaping of broadband femtosecond pulses*, is available at:
<http://www.opticsinfobase.org/oe/fulltext.cfm?uri=oe-20-23-25948&id=244866>



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