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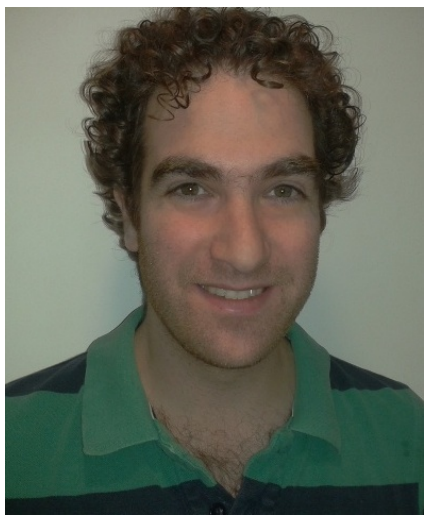
Information Science and Technology Seminar Speaker Series



Edward Rosten
Computer Vision Consulting
London, England

Bayesian Localization Microscopy

Wednesday, January 16, 2013

3:00 - 4:00 PM

TA-3, Bldg. 1690, Room 102 (CNLS Conference Room)

Abstract: The resolution of a standard fluorescence microscope is limited to about half the wavelength visible light. In practice this is around 200nm. One way to improve the resolution is to induce fluorescent molecules (fluorophores) to blink so that in each captured image the fluorophores are well separated and appear as diffraction limited spots which can be localised easily. A high resolution image can then be built up from localisations found in a large set of images. Such techniques can yield high resolutions, but require verylong imaging times, large amounts of light and careful tuning of the chemical environment, none of which are conducive to imaging live cells.

This talk describes a Bayesian analysis method which models models the entire dataset simultaneously as being generated by a number of fluorophores that may or may not be emitting light at any given time. The resulting technique allows many overlapping fluorophores in each frame and unifies the analysis of the localization from blinking and bleaching events. The high performance of this technique allowed us to reach high resolutions (50nm) with short imaging times (4 seconds) and enables us to reveal new biological results.

Biography: Edward Rosten is currently Director of Computer Vision Consulting. He received his PhD from the University of Cambridge in the area of computer vision and continued research at Los Alamos National Laboratory. He then returned to Cambridge as a research associate and then lecturer. Just over a year ago, he founded Computer Vision Consulting which provides services to a wide variety of organisations from startups to multinational corporations.

For more information contact the technical host Andy Fraser, afraser@lanl.gov, 665-9448.

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