

**WORKSHOP KEYNOTE** by Edward Rosten (*Computer Vision Consulting*)

# *Optimized Corner and Object Detection: a Completely Non-unified Approach*

**Abstract:** Many problems in computer vision involve optimization. Choosing what to optimize can be difficult; firstly because optimization of the appropriate objective may be intractably difficult and secondly because even the correct choice of objective may not be clear. This talk is about optimization in three areas of computer vision: corner detection, object detection and biological optical microscopy. A corner detector should repeatedly detect the same corners between images, and ideally should operate efficiently. These objectives can be quantified, and I demonstrate a method for generating optimized corner detectors. In object detection, the definition of a detection versus a misdetection or missed detection is not obvious. On this subject, I will present an object detection system for detecting small objects. This system introduces a new family of features, and detectors optimized for several different definitions of what 'a detection' really is. The third part of this talk is about using factorial hidden Markov model analysis as an object detection strategy to break the resolution barrier in biological optical microscopy. By optimizing the correct model—an ensemble of fluorescent protein positions – a resolution of up to four times higher than the theoretical resolution limit for this technique can be achieved.