# Workshop Keynote

## Monocular SLAM and Real-Time Scene Perception


### Andrew Davison

Imperial College London


We have seen great advances in real-time 3D vision in recent years, enabled by algorithmic improvements, the continuing increase in commodity processing power and better camera technology. Research in Monocular SLAM (Simultaneous Localisation and Mapping), where a single agile camera moves through a mostly static scene, was for a long time focused on mapping only enough of a scene to enable robust real-time motion estimation of the camera itself. Attention is now turning however to gradually improving the quality of scene reconstruction which can be achieved in real-time. I will speak about how early work on feature-based SLAM is now being surpassed by methods which aim to map dense scene structure, and how this is leading towards ever-more general 3D scene modelling and understanding.

Andrew Davison received a BA in physics and the D.Phil. degree in computer vision from the University of Oxford in 1994 and 1998, respectively. He undertook his doctorate with with Prof. David Murray at Oxfords Robotics Research Group, where he developed one of the first robot simultaneous localisation and mapping (SLAM) systems using vision. He then spent two fantastic years as a European Union (EU) Science and Technology Fellow at the National Institute of Advanced Industrial Science and Technology (AIST), Japan, where he continued to work on visual robot navigation. In 2000 he returned to the University of Oxford as a Postdoctoral Researcher working with Ian Reid and was awarded a five-year Engineering and Physical Sciences Research Council (EPSRC) Advanced Research Fellowship in 2002. During this time he developed the well known MonoSLAM algorithm for real-time SLAM with a single camera. He joined Imperial College London as a lecturer in 2005, where he teaches robotics in the Department of Computing and leads the Robot Vision Research Group. In 2008, he was awarded a five year European Research Council (ERC) Starting Grant. The group's work continues to focus on the challenges in real-time, real-world 3D vision, expanding on the core problems of localisation and mapping with cameras towards a more general real-time model-based scene understanding agenda. The wide applicability of this research in robotics and beyond into areas like augmented reality, gaming, mobile devices and automotive has been proven by strong industrial interest and the group has ongoing links with companies in several different sectors. Recent work has been recognized with best paper awards at ICRA 2010 and ISMAR 2011, and the best demonstration award at ICCV 2011.