

# Camera Intelligence from Visual Computation and Sensor Innovation



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## Abstract

The performance of how machines understand the real world depends on innovations in both visual computing algorithms and imaging sensors. Computer vision targets at recovering and understanding the 3D scene given 2D images from a camera, while computational photography provides richer measurements in addition to 2D images by improving imaging sensors. This talk will introduce recent progresses on both aspects, particularly for photometric based 3D modeling techniques that work for complex real world materials or natural illumination, and applications of novel imaging sensors that conquer the bottleneck of classic computer vision problems such as super resolution and high dynamic range imaging. By complementarily integrates the merits of both visual computation and sensor innovation, open problems in realizing intelligent cameras will also be discussed.

## Biography

Boxin Shi is an SUTD-MIT joint Postdoctoral Fellow at the Camera Culture Group (led by Prof. Ramesh Raskar), Media Lab, Massachusetts Institute of Technology, and the Vision, Graphics, and Computational Design Group (led by Prof. Sai-Kit Yeung), Singapore University of Technology and Design. Boxin earned his Ph.D. degree in information science and technology from the University of Tokyo in 2013. During his Ph.D. study, he worked at the Compute Vision Lab, under the supervision of Prof. Katsushi Ikeuchi. He has got his Master of Engineering from Peking University and Bachelor of Engineering from Beijing University of Posts and Telecommunications in 2010 and 2007 respectively. He has worked at the Visual Computing Group, Microsoft Research Asia as an intern in 2009, 2010, and 2012, supervised by Dr. Yasuyuki Matsushita. He has also worked at National University of Singapore as a Research Engineer with Prof. Ping Tan in 2011. His research interests are computer vision (photometric methods, reflectance and illumination modeling, and 3D reconstruction) and computational photography (super resolution, high dynamic range imaging, and depth sensor).