

TRACK 1: STRUCTURES AND MECHANICAL SYSTEMS
“WATER-FREE UNIVERSAL SURFACE CLEANING BY LASER”

BY
 PROFESSOR HONG MINGHUI
 NATIONAL UNIVERSITY OF SINGAPORE

ABSTRACT

Methods of large-scale cleaning are very much sought after. A good cleaning method comprises of three major criteria: (1) thorough cleaning with no contaminant particles left behind, (2) controlled cleaning where the area and depth of cleaning are precise, and (3) efficient cleaning. Conventional cleaning methods such as abrasive cleaning and wet chemical cleaning do not perform well for the first two criteria. Furthermore, both examples produce by-products and pose a threat to our environment. Laser cleaning technology, which uses a highly controllable laser beam to vaporize contaminants off the surface of material, could be a better substitute to conventional cleaning methods. It enables the realisation of a highly controllable cleaning. At the same time, laser beam generation consumes much less electricity than conventional abrasive cleaning methods, as there is no mechanical movement involved. Also, laser cleaning method is environmentally friendly, it does not produce by-product from the cleaning process. This presentation will include a brief introduction to laser cleaning technique and its general principles, and explore some of the high-impact potential industrial applications. The presentation will also show some of the laser cleaning prototypes.

BIOGRAPHY OF SPEAKER


Prof. Hong Minghui specializes in laser microprocessing & nanofabrication, optical engineering and applications. He has co-authored 10 book chapters and over 400 scientific papers. He has also been granted 26 patents and given more than 60 talks in international conferences. Prof. Hong was invited to serve as an Editor of many journals including Light: Science and Applications (Nature Publishing Group). He is Simon Industrial and Professional Fellow of the University of Manchester, UK. Prof. Hong is a Fellow of Optical Society of America (OSA), International Society for Optics and Photonics (SPIE), and Institute of Engineers, Singapore (IES). He is also a Founding Fellow and Vice President of International Academy of Photonics and Laser Engineering (IAPLE). Additionally, he is the Chairman of an NUS spun-off company: Phaos Technology Pte. Ltd.