



Seminar

Department of Engineering

Multi-Scale Engineering of Nanostructured Devices for Personalized and Preventive Healthcare

Prof. Antonio Tricoli

Nanotechnology Research Laboratory, School of Engineering, College of Engineering and Computer Science, Australian National University

Date: July 18th 2017

Time: 11:00

Venue: Room 316, Department of Engineering

The rise of wearable electronics is rapidly broadening the impact of smart phones and other lifestyle devices on our daily activities. Amongst others, this has the potential to help improving the quality and efficiency of healthcare by providing personalized methodologies for the very early-stage diagnosis and prevention of diseases. A major challenge is the development of miniaturized sensors with low-power consumption that offer comparable performance to lab-scale analytical instrumentation. Nanostructured materials have the potential to significantly enhance the performance of several devices as recently demonstrated for sensors and energy storage technologies. However, integration of nanomaterials in devices is challenging, and their assembly in suboptimal morphologies may drastically limit the final performance. Here, we will present the multi-scale engineering of highly performing optoelectronic and chemical devices by integration of ultraporous nanoparticle networks. We will showcase the use of scalable and low-cost flame synthesis technology for the wafer-level nanofabrication of well-reproducible 3D nanostructured morphologies of wide bandgap semiconductors. The potential impact of this approach and future challenges will be discussed along the example of non-invasive medical diagnostics and wearable UV photodetectors.



received his master in Mechanical and Process Engineering from the Swiss Federal Institute of Technology (ETH Zurich) in 2004. He continued his PhD studies in 2005 at the Particle Technology Laboratory of ETH Zurich, focusing on the synthesis and self-assembly of nanoparticle films by combustion of organometallic precursors. In 2008, he received his PhD in the field of Nanotechnology focusing on the self-assembly of inorganic nanostructures for catalysis. His thesis was awarded with several prizes including the HILTI award for the most innovative PhD thesis in 2010. He continued his work as research fellow and lecturer at the Department of Mechanical and Process Engineering of ETH. In September 2012, he moved to the Australian National University and established the Nanotechnology Research Laboratory at the College of Engineering and Computer Science under a FERL fellowship from the Research School of Engineering. His group research focuses on the nanofabrication of ultraporous nanomaterials for preventive and personalized medicine. He has published more than 50 journal articles in high quality venues like Nature Nanotechnology, which have cited over 1800 times. These efforts have been acknowledged with numerous prizes including the award of an Australian Research Council Discovery Project in 2014 and a Discovery Early Career Award in 2015. He recently received a WESTPAC research fellowship for the application of nanotechnology to the fabrication of wearable devices for UV light exposure monitor that may help in the prevention of melanoma and other skin cancers.

All are cordially invited to attend