Grand Technion Energy Program
תוכנית האנרגיה ע"ש גרנד

הפקולטה להנדסה כימית ע"ש וולפסון
The Wolfson Department of Chemical Engineering

Technion
Israel Institute of Technology

# Prof. Wallace Leung

***Chair Professor of Innovative Products and Technologies***
***Mechanical Engineering, The Hong Kong Polytechnic University,***
***Hong Kong***

Prof. Wallace Leung joined the Mechanical Engineering department of the Hong Kong Polytechnic University (HKPolyU) as Chair Professor of Innovative Products & Technologies in 2005. Between 2005 and 2010, he was the founding Director of Research Institute of Innovative Products & Technologies, HKPolyU, devoting to research and development of healthcare technologies in collaboration with the 26 departments in HKPolyU using a multidisciplinary approach.

Prof. Leung is an innovator, inventor and multidisciplinary engineer with expertise covering mechanical, chemical, material, petroleum and aerospace engineering; minerals processing; biotechnology; and healthcare technologies. His specialty and current research interest are fluid mechanics and nanofiber technologies as applied to nano-aerosol filtration, dye sensitized solar cells, perovskite solar cells, photocatalysis, tissue scaffolding, engine cooling, rotating microfluidics, and centrifugal separation. He has invented many technology platforms in the above sectors having a total of 45 issued United States patents and 60 scientific papers published to his credit. In Mechanical Engineering department at HKPolyU, Dr. Leung is the thermal-fluid teaching group leader. His current teaching responsibility encompasses courses on aerodynamics, air pollution control, air conditioning for indoor air quality and comfort, fluids engineering, and heat and mass transfer courses.

Prior to joining HKPolyU, he has been worked in the US industry for 25 years with Water Purification Associates, Gulf Oil R&D Company, Schlumberger, Baker-Hughes/Bird, and Advantech Engineering (founded by Prof. Leung), respectively. He has worked in filtration and separation since 1970's when he started pioneer research on reducing concentration polarization of protein with ultrafiltration membrane under laminar and turbulent flow. He has subsequently worked on lamella separation, flow in porous media, centrifugal separation and filtration. He has researched, developed, and commercialized over 10 centrifuge technologies, which have applied to minerals, biopharmaceutical and biotechnology, food, energy, recycling solid waste, and water and wastewater processes. He has 35 US patents and has authored two books (published by McGraw-Hill and Elsevier) and contributed to several handbooks (including 7th ed. Perry's Handbook for Chem. Eng.) on centrifugal separation. A dimensionless Leung number that has been used in the past 20 years was named after him for process scale-up in centrifugal separation process.

Prof. Leung received BSc in Mechanical & Aerospace Engineering from Cornell University, SMME and ScD both in Mechanical Engineering from MIT. He is a Fellow of American Society of Mechanical Engineers, American Institute of Chemical Engineers, American Society of Filtration and Separations, and Hong Kong Institute of Engineers, Senior Member of American Institute of Aeronautics and Astronautics, and Member of American Chemical Society.

**Will lecture on:**

## Applications of Nanofibers for addressing Energy and Environmental Needs

In this presentation, we will discuss applications of nanofibers in various novel configurations in addressing clean energy demand and combating pollution that threatens the environment.

The large magnitude of the solar energy available can be many times that of our annual global energy demand. Unfortunately, the high cost and low efficiency of photovoltaics (PV) render the PV technology from being considered as the popular choice. An environmental friendly PV technology is the dye sensitized solar cell (DSSC) that uses an organic dye to effectively harvest solar energy and convert efficiently photons to electrical charges. Three technologies on nanofiber-based DSSC will be presented along improvements in harvesting energy, trapping harvested energy and transporting effectively charges in the DSSC. Recently, perovskite solar cell (PSC) has been a very popular topic of research owning to the high efficiency of over 20% that has been reported. Nanofibers can also play a pivotal role in PSC as well.

Along the environmental front, pollutants in form of gaseous and particulate pollutants have been responsible for smog and chronic health problems. Filtration using nanofibers arranged in a multilayer form can remove particulate pollutants as small as 10-100 nm and reduce pressure drop. On the other hand, nanofiber-based photocatalysts can break-down or convert harmful gases, such as VOC or NOx, to harmless gases, such as carbon dioxide and water vapor. The photocatalysts are made of several composite N-type semiconductors that work synergistically to harvest effectively the entire spectrum of visible light while producing effectively the necessary radicals to oxidize the adsorbed gaseous pollutant molecules. Thus, both filtration and purification technologies can be combined that provides practical applications in combating pollution.

**Thursday, May 5, 2016, 11:30am**
**Wolfson Department of Chemical Engineering, Hall 6**
**Technion City, Haifa**

E-mail: gtep@tx.technion.ac.il
Tel: 04-8295098

**http://gtep.technion.ac.il/**