



The Chinese University of Hong Kong  
Department of Biomedical Engineering



Time: 10:00 am, 5 August 2019 (Monday)  
Venue: Room 513, William M.W. Mong Engineering Building



**Multimodality molecular imaging:  
Paving the way for personalized medicine**

By

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### **Abstract**

Positron emission tomography (PET), CT and MRI are powerful techniques for *in vivo* imaging. The inability of PET to provide anatomical information is a major limitation of standalone PET systems. Combining PET and CT proved to be clinically relevant and successfully reduced this limitation by providing the anatomical information required for localization of metabolic abnormalities. However, this technology still lacks the excellent soft-tissue contrast provided by MRI. Standalone MRI systems reveal structure and function, but cannot provide insight into the physiology and/or the pathology at the molecular level. The combination of PET and MRI, enabling truly simultaneous acquisition, bridges the gap between molecular and systems diagnosis. MRI and PET offer richly complementary functionality and sensitivity; fusion into a combined system offering simultaneous acquisition will capitalize the strengths of each, providing a hybrid technology that is greatly superior to the sum of its parts. However, the technology suffers from a number of drawbacks that will be discussed in this talk. This talk also reflects the tremendous increase in interest in quantitative molecular imaging using PET as both clinical and research imaging modality in the past decade. It offers a brief overview of the entire range of quantitative PET imaging from basic principles to various steps required for obtaining quantitatively accurate data from combined PET/CT and PET/MR systems including algorithms used to correct for physical degrading factors and to quantify tracer uptake and volume for radiation therapy treatment planning. Future opportunities and the challenges facing the adoption of multimodality imaging technologies and their role in biomedical research will also be addressed.

### **Biography**

Professor Habib Zaidi is Chief physicist and head of the PET Instrumentation & Neuroimaging Laboratory at Geneva University Hospital and faculty member at the medical school of Geneva University. He is also a Professor of Medical Physics at the University of Groningen (Netherlands) and the University of Southern Denmark. He has been elevated to the grade of IEEE fellow and was elected liaison representative of the *IOMP* to the WHO. He is developer of physics web-based instructional modules for the RSNA and Editor of *IPEM's Nuclear Medicine* web-based instructional modules. His academic accomplishments in the area of quantitative PET imaging have been well recognized by his peers and by the medical imaging community at large since he is a recipient of many awards and distinctions among which the prestigious *2003 Young Investigator Medical Imaging Science Award* given by the *IEEE*, the *2004 Mark Tetalman Memorial Award* given by the *Society of Nuclear Medicine*, the *2007 Young Scientist Prize in Biological Physics* given by the *IUPAP*, the prestigious (100'000\$) *2010 Kuwait Prize of Applied sciences* (known as the *Middle Eastern Nobel Prize*) given by the *Kuwait Foundation for the Advancement of Sciences* for "outstanding accomplishments in Biomedical technology", the *2013 John S. Laughlin Young Scientist Award* given by the *AAPM*, the *2013 Vikram Sarabhai Oration Award* given by the *SNMI*, the *2015 Sir Godfrey Hounsfield Award* given by the *BIR*, the *2017 IBA-Europhysics Prize* given by the European Physical Society and the *2019 Khwarizmi International Award* given by the Iranian Research Organization for Science and Technology. Prof. Zaidi has been an invited speaker of over 150 keynote lectures and talks at an International level, has authored over 260 peer-reviewed articles in prominent journals (Google scholar, >11'500+ citations) and is the editor of four textbooks.

\*\*\* ALL ARE WELCOME \*\*\*

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