Séminaire ETIS : Habib Zaidi

05 Juillet 2011, 11:00 – 12:00

Date et lieu

mardi 5 juillet 2011, 11h
ENSEA, salle du conseil (salle 165).

Titre

Multimodality molecular imaging: state-of-the-art and future perspectives

Abstract

Multimodality image registration and fusion plays a key role in clinical management of patients in routine diagnosis, staging, restaging and assessment of response to treatment, surgery and radiation therapy planning of malignant diseases. The complementarity between anatomical (CT and MRI) and molecular (SPECT and PET) imaging modalities is now well established and the role of fusion imaging widely recognized as a central piece of the general tree of clinical decision making. Moreover, dual-modality imaging technologies including SPECT/CT, PET/CT and in the near future PET/MR now represent the leading component of any modern healthcare institution.

Even though the introduction of dedicated dual-modality imaging systems designed specifically and available commercially for clinical practice is relatively recent, the concept of combining anatomical and functional imaging has been recognized for several decades. Software- and hardware-based correlation between anatomical (x-ray CT, MRI) and physiological (PET) information is a promising research field and now offers unique capabilities for the medical imaging community and biomedical researchers. The introduction of dual-modality PET/CT imaging systems in clinical environments has revolutionized the practice of diagnostic imaging. The complementarity between the intrinsically aligned anatomic (CT) and functional or metabolic (PET) information provided in a “one-stop shop” and the possibility to use CT images for attenuation correction of the PET data has been the driving force behind the success of this technology. On the other hand, combining PET with Magnetic Resonance Imaging (MRI) in a single gantry is technically more challenging owing to the strong magnetic fields. Nevertheless, significant progress has been made resulting in the design of few preclinical PET systems and human prototypes and even commercial systems dedicated for sequential whole-body and concurrent brain PET/MR imaging where the first patient images have been shown since 2006. This talk discusses state of the art developments and challenges of multimodality imaging technology. Future opportunities and the challenges facing the adoption of multimodality imaging instrumentation and its role in biomedical research will also be addressed.