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768th Conference

International Conference on

Medical Imaging & Diagnosis

October 20-21, 2016 Chicago, USA

Keynote Forum

(Day 1)

Zang-Hee Cho, OMICS J Radiol 2016, 6:5(Suppl)
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Zang-Hee Cho
Seoul National University, Korea

Super-resolution MR tractography with 7T MRI and its applications - From the study of language circuitry to microstructural analysis of the affective neural network

New imaging system, the brain dedicated PET-MRI, using high resolution PET and Ultra High Field 7.0T Magnetic Resonance Imaging (MRI) and their applications to brain research, especially to the areas of neuropsychiatry, neurosurgery and neuroscience will be discussed. Among the interesting topical areas, applications of the high resolution brain PET (HRRT) and the ultrahigh field MRI (7.0T) will be highlighted, especially for the *in vivo* human brain imaging with ultra-high field MRI, such as the 7.0T MRI, one can now visualize the substructures of the thalamus and brainstem *in vivo* as well as tractography hitherto unable to do with existing MRI systems. Together with molecular imaging using Positron Emission Tomography (PET), that is the brain dedicated PET-MRI fusion system developed recently, now, it is possible to visualize molecular mechanisms quantitatively in our human brain *in vivo* as well as tractography. Lastly, ultra-high field MRI also began to provide excellent tractographic images delineating fine fibers such as medial forebrain bundles and internal medullary laminars in the thalamo-limbic areas suggesting future potential applications of these fibers to, among others, such as the DBS (Deep Brain Stimulation). Some recent results of brain PET-MRI fusion system as well as the new tractographic images obtained with 7.0T will be discussed and highlighted.

Biography

Zang-Hee Cho received PhD in Physics, from University of Uppsala, Sweden. Since then, he has been faculty of UCLA, Columbia University, and University of California, Irvine. Last ten years, he served as a Director of the Neuroscience Research Institute, Gachon University and established one of the leading PET-MRI brain imaging centers in the world. He is an early pioneer of CT and PET, developing world's first circular ring PET (at UCLA, 1975) and BGO (PET-detector, 1976) and more recently 7.0T MRI+PET Fusion Brain Imaging System at NRI, in Korea. Currently, he is serving as a Distinguished Research Fellow at Seoul National University, Seoul, Korea, and also as a member of National Academy of Medicine, Washington DC, USA.

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Sanjay Gandhi, OMICS J Radiol 2016, 6:5(Suppl)
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Sanjay Gandhi
North Bristol NHS Trust, UK

Latest developments in radiology healthcare IT, digital imaging and telehealth

Exciting new innovations in healthcare technology such advanced image analysis, Tele-Health, Micro Robotics, etc., are changing the landscape of healthcare. These advances are enabling us to deliver high-quality care to a wider population. New technology often brings improved productivity and efficiency savings. New developments in Healthcare-IT are leading the way in developing new care pathways such as image and model guided therapies. Teleconferencing and specialist opinion for complex cases, Computer Aided Detection/Diagnosis (CAD), automated image analysis are helping professionals to deal with increasing workload. As a result, we are benefiting from both the technical efficacy and improved diagnostic accuracy. These innovations have additional benefits in medical education, training, assessment and quality assurance. We will discuss the benefits of the latest developments to patients, radiologists, clinicians along with potential savings for hospital management. At the same time, there is a fear that digital health tools may lead to burning out of physicians and impede care. Studies have shown that the majority of self-proclaimed health apps in the market aren't tested on patients and more worryingly, rouge organizations make false or exaggerated claims. Some of the melanoma detection apps were fined recently by the FTC for claiming to diagnose skin cancer. In addition to these subjects, this presentation will highlight several practical examples of medical innovations through the stages of concept, design, pilot and successful implementation. Furthermore, there will be practical information for healthcare sector's entrepreneurs, who wish to develop pioneering products for the future.

Biography

Sanjay Gandhi is a senior attending Radiologist at one of the largest teaching hospitals and regional trauma units in the UK. For the past 17 years, he has been teaching the University of Bristol and University of West of England trainees. As Honorary Professor, he also teaches at Sri Devaraj Urs University, India. He has won multiple academic awards and has been involved in numerous research projects and collaborative trials. He has published widely on use of cutting-edge technology and co-authored and edited 8 medical textbooks. He is an internationally recognized leader in HealthcareIT and development of Smart Apps.

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Jamal Zweit, OMICS J Radiol 2016, 6:5(Suppl)
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International Conference on

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Jamal Zweit

Virginia Commonwealth University, USA

Multi-modality image-guided nano-theranostics

The merging of molecular imaging and nanomedicine is emerging as a powerful platform to comprehensively interrogate the biology of disease and working of therapies in the era of precision medicine and health. The marriage of the two disciplines stems from the natural compatibility of the biochemicals used as molecular imaging probes and nanoparticles. Nanoparticle technology is advancing at a rapid pace and is finding a "niche" in biomedical applications, including drug delivery, nano-therapeutics, multi-modality imaging and molecular diagnostics. The combination therefore of molecular imaging and nanomedicine is poised to offer a true theranostic approach in precision health. In this talk, we will highlight recent advances in multi-modality image-guided nano-theranostics, from various laboratories including ours. We will describe an "all in one" approach where therapeutic entities are imbedded within nanoparticles, the core/shell of which also serves as molecular imaging agents. The unique intrinsic approach to nano-theranostics will be exemplified by multi-modal molecular imaging including PET/CT, SPECT/CT, MRI and photoacoustic imaging. The "all in one" concept can also accommodate multiple therapeutic strategies including photo-thermal-therapy, targeted radiotherapy, immunotherapy and chemotherapy drugs. We envision that this novel theranostic approach has promising potential for high sensitivity and quantitative imaging using clinically applicable modalities.

Biography

Dr. Zweit is a professor of Radiology, Radiation Oncology, Molecular Pathology, Biochemistry & Molecular Biology and Chemistry. He is the Director of the Center for Molecular Imaging and a senior member of the Massey Cancer Center at Virginia Commonwealth University Medical Center. He leads an inter-disciplinary and inter-collaborative molecular imaging and nanomedicine research program that emphasizes multi-modality molecular imaging approaches to study biochemical and biological pathways in vivo. Professor Zweit's research interests include the development of paradigms for molecular imaging and nanotechnology strategies for preclinical and clinical translational research in cancer, neuroscience and immunotherapy. Zweit is internationally recognized for his work in molecular imaging of cancer drug development, and conducted the "world's first" Molecular PET Imaging clinical trial of Anti-angiogenic therapy in cancer patients (Journal National Cancer Institute 2002 & 2006). Professor Zweit serves as an advisor on a number of national and international committees. He serves on the review body of a number of funding organizations, both in North America and Europe. He has supervised and advised a total of 32 MSc, MD and PhD theses, and 30 post-doctoral Fellows. He has published more than 150 peer reviewed articles, over 250 conference abstracts, and 6 review articles and book chapters. Professor Zweit obtained his PhD and DSc from the University of Manchester Medical School. He received his Nuclear Medicine training at the John F. Kennedy Medical Centre in New Jersey, and attended advanced Nuclear Medicine training at the Brooklyn Hospital in New York. As an Undergraduate, he obtained his Bachelor of Science degree, in Radiation Biophysics, with a Biochemistry double major, from the University of Kansas.

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Michael L Goris

Stanford University School of Medicine, USA

Clinical validation of diagnostic imaging procedures

When new imaging is introduced in clinical settings, little is known about their potential to improve care. Acceptance is mostly based on how well structures can be seen on the images. True clinical validations are perceived as time expensive and difficult to fund. In this paper we look for alternatives. The defining diagnosis (e.g. by histology, microbiology) is a type of taxonomy, but is that taxonomy related to outcome? The validation of defining diagnostic technique is solipsistic. We will look at: Outcome analysis: Since imaging represents only a few steps in a chain of diagnostic and therapeutic interventions, it is difficult to ascribe the outcome to any specific link. The performance of an imaging test may be excellent, but there may still be adverse outcomes; outcomes evaluations of imaging are rare. Predictive power: A taxonomic exact diagnosis may not be predictive. If the median survival time is n years: 50% percent die earlier, 50% later. Staging refines the prognosis, or the expected response to a particular therapy. Imaging can predict if therapy will fail or succeed. Predicting taxonomy: The most relevant aspect of this approach is that at some point there has to be a defining test. Or that a ground truth is assumed to be known. The major problem is verification bias in the first case. There are ways to overcome is verification bias. Discriminating power: It is the ability to distinguish between closely related populations in all aspects except the actual disease. Equivalence: It is based on the (false) assumption that a gold standard reflects the ground truth. The result is the inability to show diagnostic superiority (no worse than). In conclusion, there are approaches to evaluate diagnostic imaging, which are both valid and not too expensive.

Biography

Michael L Goris has a Medical degree from the University of Leuven in Belgium and a PhD degree in Medical Physics from UC Berkeley. He has been a Professor in the Stanford Medical School and is Emeritus since 2012 and served as a Chairman for University panel on Radiation safety during 2003-2010. He has more than 120 publications in peer reviewed journals. His research interests are radio-immunotherapy, medical imaging processing and quantification for diagnosis of clinical validations.

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