



2nd World Congress on

Medical Imaging and Clinical Research

September 11-12, 2017 | Paris, France

Keynote Forum

Day 1

Medical Imaging and Clinical Research 2017

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Sanjay Gandhi

Southmead Hospital, UK

The role of computer-assisted detection (CAD), artificial intelligence and machine learning in the medical imaging data overload problem: Current practice, limitations and new developments

The demand for diagnostic imaging has continued to increase dramatically over the past few decades. More than 5 billion diagnostic tests are performed globally each year. Replacement of older modalities such as Barium enema with CT colonoscopy and isotope VQ-scans with CT pulmonary angiography has also massively contributed to increased image datasets per examination. As a result, the majority of Radiologists and other healthcare professionals have to review tens of thousands of images every day. Fortunately, technologies such as Computer Aided Detection (CAD), 3D processing and automated image analysis have also continued to develop. These are becoming increasingly more reliable and affordable. Computer-assisted polyps and cancers detection on virtual-colonography, nodules on lung cancer screening and analysis of breast lumps on MR mammography are just a few of the examples. We will discuss the accuracy and use of different CAD programmes. Our research has shown that a large variation exists in sensitivity and PPV of commercially available software. Some programmes suffer from very long analysis times. Hence, companies producing CAD tools need to address these issues. The role and potential of new technologies such as Artificial Intelligence (AI) and machine learning in coping with the massive increase in the medical imaging workload will be explored. This talk will cover the pitfalls and provide practical tips on the use of these techniques. Such information is useful for Radiologists and Radiographers/Technicians. In addition, CAD developers and other healthcare sector's entrepreneurs might find this discussion useful in order to develop future products.

Biography

Sanjay Gandhi in his 30-year career spanning over the UK, India and the USA, has won several outstanding awards for his contributions to the Healthcare Innovations and Education. Times TV Network honoured him as a Global Academic Icon and the British Medical Association honoured him as a Highly Commended Editor. He has published 8 textbooks and written several papers on the use of cutting-edge technology to improve patient care. He has expertise in innovative Telehealth products including CAD, Diagnostic & Assessment Tools, PACS, etc. and has been an advisor to multinational organisations. He has also been involved in numerous research projects and collaborative trials. He has regularly published accomplished articles, rare medical conditions and research papers in reputable indexed international journals such as *British Journal of Radiology (BJR)*, *British Journal of Hospital Medicine (BJHM)* and *British Medical Journal (BMJ)*. He is on the Editorial Boards of four peer-reviewed medical journals. His current research areas are Computer-Assisted Detection (CAD) to find polyps on CT colonography and he is supervising PhD Research on the use of Artificial Intelligence and Machine Learning.

GandhiS@doctors.org.uk

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Vikas Leelavati Balasaheb Jadhav

Dr D Y Patil University, Maharashtra, India

Trans-abdominal sonography of the stomach and duodenum

Trans-abdominal sonography of the stomach and duodenum can reveal following diseases: gastritis, duodenitis, and acid gastritis. An ulcer, whether it is superficial, deep with risk of impending perforation, perforated, sealed perforation, chronic ulcer and post-healing fibrosis and stricture, polyps and diverticulum, benign intra-mural tumors, intra-mural haematoma, duodenal outlet obstruction due to annular pancreas, gastro-duodenal ascariasis, pancreatic or biliary stents, foreign body, necrotizing gastro-duodenitis, tuberculosis, lesions of ampulla of vater like prolapsed, benign and infiltrating mass lesions. Neoplastic lesion is usually a segment involvement, and shows irregularly thickened, hypoechoic and aperistaltic wall with loss of normal layering pattern. It is usually a solitary stricture and has eccentric irregular luminal narrowing. It shows loss of normal gut signature, enlargement of the involved segment seen, and shouldering effect at the ends of stricture is most common feature. Enlarged lymph-nodes around may be seen. Primary arising from wall itself and secondary are invasion from peri-ampullary malignancy or distant metastasis. All these cases are compared and proved with gold standards like surgery and endoscopy. Some extra efforts taken during all routine or emergent ultrasonography examinations can be an effective non-invasive method to diagnose primarily hitherto unsuspected benign and malignant gastro-intestinal tract lesions, so should be the investigation of choice.

Biography

Vikas Leelavati Balasaheb Jadhav has completed Post-graduation in Radiology in 1994. He has 23 years of experience in the field of Gastro-intestinal tract ultrasound and diagnostic as well as therapeutic interventional sonography. He has four Indian patents and an international patent in the field of Gastro-intestinal tract sonography and Radiology, since 2008. He has delivered many lectures in Indian as well as international conferences in nearly 27 countries as an Invited Guest Faculty, since 2000. He is a Consultant Radiologist and Specialist in Unconventional Gastro-Intestinal Tract Ultrasound and Diagnostic as well Therapeutic Interventional Sonologist in Pune, India.

drvikasjadhav@gmail.com

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Daniel L Farkas

University of Southern California, USA

Multimodality imaging for clinical research: The role of bio-photonics

In order to see the bench-to-bedside dream of translational research become a reality, we need to develop imaging approaches that is technologically sophisticated, allow deployment into a clinical setting. Multimodality imaging is gaining adoption, but the bio-photonic component is absent or un-sophisticated. Our focus area is where light and patient meet, and improvements that yield better outcomes, by identifying/addressing the obstacles preventing timely clinical adoption of laboratory-based advances, not the least of which is the difficulty of detecting, characterizing and monitoring very small entities (molecules, cells) within the human body, especially quantitatively, dynamically, and preferably without contrast agents. How and where we look becomes critically important, especially if one targets (as one should) early diagnosis; for this, new tools and strategies are needed, with likely new outcomes. We proposed and implemented an optical multimode approach to biomedical optical imaging at all levels, featuring hyperspectral imaging, and optimized for earlier, more quantitative/reproducible detection of abnormalities and a tighter spatio-temporal coupling between such diagnosis and intervention. Addressing major areas of unmet need in the clinical realm with these new approaches should yield important improvements in disease management. Our work on cancer, stem cells, vascular and neuro (specifically highlighting very early detection of Alzheimer's disease) applications will be described, with emphasis on the new technologies needed to achieve the desired imaging performance. Thoughts about better ways for academia, the clinical and the corporate world to work together for innovative imaging solutions and their use for addressing major disease will be briefly outlined.

Biography

Daniel L Farkas is a former Fulbright scholar, directed a National Science and Technology Center at Carnegie Mellon University. He was Professor of Bioengineering at University of Pittsburgh, and Vice-chairman for research and; Professor of Surgery at Cedars-Sinai Medical Center. He has 200+ publications, 11 editorial boards, \$80 million funding, 32 international conferences chaired, and several prestigious awards. His focus is on translational biomedical optics, in academia and startups he founded.

difarkas@gmail.com