11th International Seminar on Medical Physics (ISMP) 2019

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Biography

Andy has worked in the NHS, as a clinical Radiotherapy Physicist, since 1992. He is the Head of Medical Physics in the Hull and East Yorkshire Trust and leads a department of approximately 100 scientists, technicians and engineers, providing the scientific/ physics input to Radiotherapy, Radiation Protection, Diagnostic x-ray imaging, Nuclear Medicine, MRI and Clinical Engineering. He has contributed to the development of many new clinical techniques, for the treatment of cancer with radiation, in Hull. These include: continued development of computer aided treatment planning, Conformal therapy (development of the 3D-CRT process), implementation of Intensity Modulated Radiotherapy into clinical use, Implementation if Image Guided Radiotherapy into clinical use, use of advanced MRI in routine planning, Virtual Simulation process, Development of Virtual reality training/ clinical tools and the National implementation of this technology into routine use. He has served on a number of National committees and has chaired the NRIG Service Development sub-committee and the National Radiotherapy Board. In 2016 he was invited to present in the Houses of Parliament about the future of Radiotherapy to an All Party committee. He is a Founder and Director of Vertual Ltd which manufacturers a Virtual Environment for Radiotherapy Training (VERT). Partially for this and also for his services to the education of radiographers, in 2016 he was awarded the Silver Medal by the Society and College of Radiographers.

Title: Computer Simulation Training for Radiation Therapy

Abstract

In recent years the use of computer simulation based training within medicine has developed in a number of ways, however it has not been widely used in Radiation Oncology. In this presentation, as an introduction, we will briefly explore the potential and the use of simulation training, looking at some of the principles, rationale and benefits of computer simulation or virtual reality. Evolving out of our own clinical and educational research interests, the VERT system was developed in order to explore novel method for training professionals involved with Radiation Oncology. The system was designed, in the first instance, as a tool for training Therapists though latterly its scope has been broadened. The

VERT system essentially brings a fully articulated Linac with all the expected functionality into the classroom and allows the teacher and trainee to explore fundamental concepts and to ‘set up’ patient treatments. The delivery of any treatment plan can be simulated in VERT using data from treatment planning systems. Arguably the real strength of any computer simulation training system is the ability to simulate error conditions and machine mis-calibrations. This will be explored during the presentation, showing how trainees can use it to understand the consequences of patient mis-positioning or machine errors.

Title: MR Guided Radiation Therapy – The MR-Linac

Abstract

The MR-Linac has brought the possibility to utilise high contrast soft-tissue imaging in IGRT. The benefit this brings to the delivery of high-precision radiation therapy could make a significant change to treatment outcomes and is a major step to allow adaptive therapy. As well as improving the ability to image soft tissues, the opportunity to image whilst the treatment beams are applied is an exciting development. In this talk we will review the rationale for the MR-Linac and discuss the benefits gained by bringing these conflicting technologies together to create a hybrid treatment/ imaging machine. The engineering challenges of achieving this non-trivial task will also be presented and discussed. The approaches and major differences of the two commercially available systems (Viewray MRIdian and Elekta Unity) will be presented. The workflow and case studies from clinics using MR-Linacs and the earlier Cobalt-MRI systems will be presented to illustrate the benefit of MR-guided treatments. This talk will be of interest to those wishing to understand more about the emergent MR-Linac systems and the benefits the technology offers to the further development of radiation therapy.