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FACULTEIT GENEESKUNDE EN FARMACIE

Doctoraat Medische Wetenschappen
Academiejaar 2007-2008

UITNODIGING

Voor de openbare verdediging van het doctoraatsproefschrift van

Nico BULS

19 februari 2008

U wordt vriendelijk uitgenodigd op de openbare verdediging van het proefschrift van

Nico BULS

'Patient and staff dosimetry in diagnostic and interventional radiology'

Op **dinsdag 19 februari 2008**
om **17 uur**
in auditorium **P. Brouwer** van de
Faculteit Geneeskunde & Farmacie
Laarbeeklaan 103, 1090 Brussel

Situering van het proefschrift

This work evaluated radiation doses for a selection of x-ray examinations in diagnostic and interventional radiology (IR) that offer unusual challenges to radiation protection. For IR applications, doses were evaluated during endoscopic retrograde cholangiopancreatography (ERCP) and during procedures that applied CT Fluoroscopy (CTF). Results demonstrated the risk for high patient skin doses and identified that the eye of the interventionalist is the organ at most risk. A drastic dose reduction in CTF was achieved due the combination of utilising a low tube current technique in combination with intermittent fluoroscopy and a system that interrupts x-ray tube exposure when it travels above the patient. In the diagnostic radiology field, a multi-centre study was performed of doses to children from CT scans, and an assessment was performed of dose and risk from prospective health screening programmes with CT. Results demonstrated that children may be exposed to unnecessarily high radiation doses when scan parameters are not optimised. Excess mortality risk factors are demonstrated for potential health screening programmes with CT. They indicate that dose should be considered as a fundamental parameter for outlining a screening strategy. Screening with CT could be justified for a targeted population with an elevated predisposed mortality risk. Patient dose optimisation also involves quality assurance of the total imaging chain in radiology. We identified physical properties of medical display devices that influenced diagnostic performance and suggest a quality assurance programme to detect non-optimised systems.

Curriculum Vitae

After finishing engineering studies in nuclear energy, Nico Buls continued master after master studies in Biomedical Engineering with specialisation in Medical Physics. He started working at the VUB in 1997 on a EU funded research project about decommissioning of particle accelerators under the supervision of Prof Alex Hermanne and Prof Gilbert Eggermont.
His career in Radiology started in 1999 under the supervision of Prof Michel Osteaux and later under Prof Johan de Mey. His main research topics in radiology are dosimetry, x-ray acquisition, implementation of digital techniques and image quality. His research has resulted in one book chapter in an international textbook and 13 peer-reviewed articles, 5 of which as first author. In 1999 he was recognised by the Ministry of Health as a medical physics expert within the field of radiology. He has won the Young Physicist Grant from the Belgian Hospital Physicists Association in 2001 for his work in CT-Fluoroscopy, and was a laureate at the Biomedische genootschap (TI-BIOM) in 1999 with his master thesis about occupational exposure. He has obtained funding from the Federal Agency of Nuclear Control in 2004 for occupational dosimetry research in interventional radiology, and in 2007 for dosimetry research in paediatric CT. He currently works as a full time medical physicist at the UZ Brussel and is a research member of the VUB Medical Imaging and Physical Sciences team (BEFY). He is married to Jessy Dons, they have two children Cleo and Rafaël.