

## Focus on Faculty #15

### Jan Seuntjens



[Dr. Jan Seuntjens](#) is a James McGill Professor in the Department of Oncology and Director of the McGill Medical Physics Unit (MPU). He joined McGill as an Associate Professor in 2000, received tenure in 2004 and became Full Professor in 2011. He works at the Cedars Cancer Centre at the MUHC- Glen Site.

Dr. Seuntjens obtained a PhD in radiation physics and dosimetry in 1991 from the University of Ghent, Belgium. During his PhD studies Dr. Seuntjens completed an internship at the Physikalisch Technische Bundesanstalt (Braunschweig, Germany) at the time of German reunification. After three years of postdoctoral training he joined the radiation standards group at the National Research Council, Canada in 1995, first as a Research Associate and subsequently as a Research Scientist. His research was on the development and dissemination of standards for ionizing radiation for the calibration of detectors used in medical applications. During his PhD and post-doctoral training Dr. Seuntjens was involved in the development of new protocols used for standardization of radiation therapy dosimetry. He was one of the early experts in the field of the computational Monte Carlo technique to address fundamentals of radiation detectors and more clinically oriented topics such as radiation dose calculations in patients.

As Director of the MPU since 2009, Dr. Seuntjens initiated a modernization of the longstanding McGill Medical Physics MSc and PhD graduate programs. One important milestone in the program modernization has been a new training network funded in 2013 by a substantial grant from the Natural Sciences and Engineering Research Council (NSERC) as part of their CREATE funding program ([mprtn.com](http://mprtn.com)). This network, in collaboration with Laval University (Québec) and through partnering with institutions around the world, gathers international expertise and resources and integrates it in the graduate training of future medical physicists.

The focus of Dr. Seuntjens' research has been on the development and application of advanced radiation physics and dosimetry techniques in the optimization of radiation therapy planning and delivery, with the ultimate goal of improving clinical outcomes. One area of considerable interest

has been the development of novel detectors useful in standardization of therapy dosimetry. A recent [success](#) has been the development of a disruptive detection technology based on calorimetric principles that has now been translated in detector prototypes that may change clinical radiation measurements in the near future. Other applications of Dr. Seuntjens' expertise are in the use of nanoparticles in radiation therapy dose enhancement and an array of studies that correlate patient dosimetry with endpoints such as local control and complications. Dr. Seuntjens' research has been supported by NSERC, CCSRI and CIHR for the past 1.5 decades.

Dr. Seuntjens has been involved with various national and international organizations to standardize radiation therapy dosimetry. He has played a key role in translating the Monte Carlo calculation technique into clinical practice by writing guidelines for their implementation and by organizing, at McGill - thus far - five international workshops (2001 – present) to monitor and influence the development of these techniques internationally. Dr. Seuntjens is part of the administrative team in charge of the MUHC clinical medical physics service and is clinically involved with the implementation of some of the specialized techniques. As an example, intraoperative radiation therapy is a technique by which radiation is delivered as part of the surgical procedure in the OR. Its implementation is very involved and requires multidisciplinary cooperation. The MUHC has been the first in Quebec to apply it to early stage breast cancer and will be the first in the country to apply it to the treatment of glioblastoma.

We asked Dr. Seuntjens to list a few of his articles whose work he is particularly proud or enjoyed the most. This is what he provided:

**Seuntjens J**, Lartigau E, Cora S, Ding GX, El Naqa I, Goetsch S, Nuyttens J, Roberge D Prescribing, Recording and Reporting of Stereotactic Treatments with Small Photon Beams, International Commission on Radiation Units and Measurements. J. ICRU (in press, 2016).

Andreo, P, Nahum AE, Burns DT, **Seuntjens J**, Attix H Fundamentals of Ionizing Radiation Dosimetry. Wiley (in press, 2016).

Bouchard H, **Seuntjens J** (2004) Ionization chamber-based reference dosimetry of intensity modulated radiation beams, Med. Phys. **31**, 2453-2464 (*this paper won the American Association for Physicists in Medicine, Farrington Daniels Award for Best Paper in Radiation Dosimetry in 2004*).