

MAE Graduate Studies Seminar Series

The Technology of Radiation Therapy Delivery: From Roentgen's X-ray Tube to Future Compact Proton Accelerators

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Abstract:

The goal of radiation therapy is to accurately deliver the necessary dose to a target volume while minimizing the dose received by healthy tissue that may be in the vicinity of the target. There is a general consensus in the clinical community that for radiation therapy to be successful the delivered dose must be accurate to within a few percent of the prescribed dose. Over the years the technology used in the delivery of radiation dose has evolved from the original x-ray tube discovered accidentally by Roentgen in the late 1800's to today's proposed compact proton accelerators and robotic units. Some notable steps along the way include megavoltage linear accelerators developed initially in the 1950's that are still being perfected today with the incorporation of image guidance. Also of note are the miniature electron waveguides that have recently been built into rotational delivery units and even mounted onto robots allowing very precise aiming of the beam. Future developments will certainly make increased use of particle radiation, and the implementation of small proton accelerators is already on the horizon. All of these developments have resulted from a partnership between clinicians, physicists, and, in many instances, engineers who have offered their expertise in solving many challenging problems associated with the translation of products from the research bench to actual clinical use. Various interesting stops along the timeline of development of radiation therapy delivery devices will be presented.

Biography:

Dr. Matthew B. Podgorsak holds the Chief Physicist position in the Department of Radiation Medicine at Roswell Park Cancer Institute (RPCI) and also currently serves as Associate Professor, Department of Molecular and Cellular Biophysics, University at Buffalo (UB). He is board-certified in Radiation Oncology Physics by the American Board of Medical Physics and the American Board of Radiology and is also licensed by the State of New York Education Department to practice Therapeutic Medical Physics.

Dr. Podgorsak's research focuses on stereotactic radiosurgery, principles and practice of intensity modulated radiation therapy (IMRT), and state-of-the-art procedures and techniques in radiotherapy. Dr. Podgorsak has authored or co-authored more than 110 journal articles, book chapters and abstracts. He also serves as a reviewer for several journals, including the International Journal of Radiation Oncology, Biology, and Physics; the Journal of Applied Clinical Medical Physics; Physics in Medicine and Biology; Radiology and Oncology; and Medical Physics.

110 Knox Hall
Thursday, January 22th, 2009
3:30 pm - 4:30 pm

**Please contact Dr. Puneet Singla at psingla@eng.buffalo.edu
for more information or to request a meeting with
Dr. Podgorsak.**