

From Physics to Medical Physics

- A Personal Journey –

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Medical physics is the branch of physics applied to the diagnosis and treatment of human disease. Its main areas of interest are the treatment of cancer by ionizing radiation (*radiation oncology*), diagnostic imaging with x rays, ultrasound and nuclear magnetic resonance (*diagnostic radiology*), diagnostic physiological imaging with radionuclides (*nuclear medicine*) and the study of radiation hazards and radiation protection (*health physics*). While a strong background in physics is *sine qua non*, additional academic training, a thorough understanding of the practice of medicine and practical experience with medical equipment are essential for someone looking to become a certified medical physicist. The main areas of activities, the relative distribution of responsibilities, as well as the employment opportunities for the medical physicists are presented.

Emphasizing on the basic principles of diagnostic imaging and in the light of the renewed public concern about radiation exposure from all radiological exams but in particular from Computed Tomography (CT) exams, a computational methodology using Monte Carlo radiation transport simulations in tomographic human phantoms, developed to assess patient doses in a fast and accurate manner is presented, along with its experimental validation. As a powerful example of current public interest, the application of this methodology to the optimization of low-dose clinical brain perfusion CT protocols using a novel broad-beam CT scanner at Shands&UF is also presented.

Host: Mihai Horoi

Cookies and coffee @ 3:30pm in Dow 201.