

## Application of monte carlo simulations in nuclear medicine imaging

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Monte Carlo (MC) methods consist of a very broad area of science, in which many processes, physical systems and phenomena are simulated by statistical methods. Nowadays, MC methods are widely used to solve complex physical and mathematical problems, particularly those involving multiple independent variables where more conventional numerical methods would demand formidable amounts of memory and computer time. In this context, nuclear medical imaging techniques, such as Single-Photon Emission Computed Tomography (SPECT) or Positron Emission Tomography (PET), are ideal for MC methods due to the stochastic nature of radiation emission, transport and detection processes.

This presentation will provide an overview on the different applications of MC simulation techniques in PET and SPECT imaging; from the characterization of existing imaging systems to the design and optimization of new scanners and the evaluation of advanced image reconstruction and data processing techniques.

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