

David Sarrut

Short Biography:

David Sarrut is a CNRS senior researcher specializing in medical image processing, simulations, and medical physics. His primary focus lies in the application of these fields to cancer treatment through radiotherapy and imaging with ionizing radiation, including nuclear imaging and therapies. He has co-authored over 90 international journal articles and 80 papers in international conferences (e.g. most cited author & most cited paper in PhysMedBiol in 2011 and 2014). He has actively participated in 20+ European and ANR projects. He has successfully supervised the defense of 17 PhD theses, with three ongoing projects. Currently, he leads the "Tomoradio" team at the CREATIS CNRS-INSERM laboratory, focused on tomographic imaging and therapy with radiation. This collaborative effort is closely connected to the radiotherapy and nuclear medicine departments in the Léon Bérard cancer center in Lyon.

Abstract:

Monte Carlo methods have traditionally played a crucial role in SPECT and PET simulations, providing accurate modeling of imaging devices for various uses such as designing new detectors or improving acquisition setup. However, the computational demands of Monte Carlo simulations have often presented challenges in terms of efficiency and practicality. Recent advances in AI techniques offer promising opportunities to accelerate Monte Carlo simulations. During this talk, we will explore various AI-based approaches that facilitate the acceleration of Monte Carlo methods in SPECT and PET. In particular, we will review conditional GAN (Generative Adversarial Networks) for representing phase-space of particles, both for single and back-to-back particle tracking. Current challenges and limitations will also be described