

## Hosting group information for applicants

Name of DKFZ research division/group: **Division of X-Ray Imaging and CT (E025)**

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Group homepage: **[www.dkfz.de/ct](http://www.dkfz.de/ct)**

Please visit our website for further information on our research and recent publications.

### RESEARCH PROFILE AND PROJECT TOPICS:

The division of X-Ray Imaging and CT focusses on algorithmic and on hardware developments in the field of x-ray CT, including dual source CT, dual energy CT and spectral CT. We have access (direct or through collaboration partners) to the most modern diagnostic CT systems (Siemens Flash, Siemens Force, Siemens Count), to the most modern interventional CT systems (Siemens Artis Zeego, Ziehm Vision RFD 3D), and to the most modern cone-beam CT systems used for radiation therapy (e.g. Varian True Beam). And we have access to several experimental CT systems which are in-house developments. Besides that parts of our algorithmic work made its way into the MR and PET world and thus a small fraction of our research develops dedicated algorithmic approaches for these two modalities.

A potential project for a postdoctoral fellow is PET scatter correction using neural networks. The aim of this project is to develop a scatter estimation and correction approach, considering both single and multiple scatter, which provides quantitative and artifact-free PET images and which is sufficiently fast to be applicable in clinical routine. The new method shall be based on a deep learning technique that is trained by Monte-Carlo scatter estimates. Thereby it is related to the deep scatter estimation (DSE) algorithm developed in our division to correct for x-ray scatter in computed tomography [<http://dx.doi.org/10.1002/mp.13274>]. The candidate will be developing a Monte-Carlo algorithm for PET and will be implementing a neural network capable of predicting the Monte-Carlo output. To validate the new method, the candidate will compare the obtained results to results obtained employing the full MC simulations, both using in-house and Geant4-based software. All algorithms implemented shall be tested and evaluated using both simulated and measured PET data, acquired with modern clinical PET/MR and PET/CT devices available at the DKFZ.



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