

Research Grants for PhD students from the China Scholarship Council

Information Form (please read the guidelines carefully on the website www-csc.utt.fr)

Supervisor's name : Given names :

Status (prof., assistant prof., ...) :

Laboratory : Website address :

Institution : Website address :

Scientific competence of the supervisor:

Expertise in the modeling of particle transport for Monte Carlo simulation, variance reduction techniques, image reconstruction and inverse problems. Author of more than 30 articles related to medical imaging in peer-reviewed journals in the last 5 years (see cv.archives-ouvertes.fr/jean-letang website).

Two major publications in the field proposed for the PhD :

1.
2.

Website address of the personal page :

Supervisor's email :

Description of the research work proposed for a PhD **Topic # (see list) :**

Title :

Subject :

The main objective is to develop new Monte Carlo based methods for the simulation of phase contrast imaging. X-ray phase contrast imaging permits to reach nanometric resolution in tomographic imaging. Currently, there are no realistic simulators of X-ray phase contrast. This would have several benefits: optimisation of imaging conditions and reconstruction, planning of experiments, investigation of artefact sources, as well as providing data for machine learning algorithms. Phase contrast is usually modelled from a wave perspective using the Fourier transform, while scattering is usually modelled from a particle perspective using e.g. Monte Carlo simulation. The challenge is therefore to combine the two perspectives. Since the physics of phase contrast imaging remains the same, the scope for application is vast. Here, three modalities are envisaged: 1) X-ray propagation-based imaging, 2) X-ray speckle-based imaging, 3) Holographic microscopy. The developed simulations will be validated using experimental data acquired at synchrotron radiation facilities, laboratory X-ray sources and visible light holographic imaging devices. Targeted applications include optimisation of speckle masks, optimisation of imaging conditions for sychrotron radiation imaging experiments, and optimisation of phase contrast imaging for clinical mammographic imaging.

Keywords :

Expected collaborations :

Background required from the applicant :

Existence of a PDF file detailing the proposal ("yes" or "no") :

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