

## **Title**

Modelling the impact of respiratory motion on the detection of pulmonary nodules in PET imaging and applying motion correction methods

## **ABSTRACT**

Positron emission tomography (PET) is an imaging technique of nuclear medicine that provides anatomical and functional information for an organism, aimed at early diagnosis. One of the major applications of PET is in oncology, displays the type of tumor, evaluate the effectiveness of treatment and helps in choosing the right treatment.

This thesis aims to create a model that simulates the movement of a solitary pulmonary nodule due to respiration. The solitary pulmonary nodule is a common finding, which may represent a primary lung cancer or other malignant. For the creation of the model the equation of breathing, the amount of movement and direction that will move the nodule are taken account.

There are two motion correction methods, the RTA and the MCIR. In this thesis I produced 11 PET images for a respiratory cycle, reconstructed with three different reconstruction algorithms, calculated the motion fields for each image and the corrected image was produced and evaluated.

**SUBJECT AREA:** Simulation of respiratory motion

**KEYWORDS:** respiratory motion, motion correction, nodule, positron emission tomography