Project Option 2: Visualization of 4D CT Data to Assess Respiratory Dynamics

Dynamic thoracic CT scans (i.e., 4D CT data sets) allow for the analysis of lung structures movement. Lung movement is important for several application such as radiation treatment planning or development of lung diseases.

The main goal of this project is to provide visualizations that allow the analysis of the lung's movement during breathing given a 4D CT data set. The amount of movement, location and (shape) deformation of the lung structures during breathing are considered relevant.
Define specific questions that you want the user to be able to investigate with visualization techniques. Design and develop visualizations that address these questions. This project offers you the possibility to study and be creative on visualizing changes and dynamic behaviour.
Notice that you have time varying data, that offers also extra possibilities to what we have seen in the course. MeVisLab offers control of time-points using the `t` parameter. Recall from the labwork for instance that the `ImageResample` module had multiple fields along which you could reduce the dataset. This `t` parameter can be selected in e.g. a `View2D` module using the left and right arrow keys. You can select timepoints using the `timePoint` field in an ROI-select module.

Further read:
Paper 1:Dynamic ventilation imaging from four-dimensional computed tomography
Paper 2: Simultaneous Assessment of Airway Instability and Respiratory Dynamics with Low-Dose 4D-CT in Chronic Obstructive Pulmonary Disease: A Technical Note

Data: https://surfdrive.surf.nl/files/index.php/s/OKzG2GGWEGdhUhz. These data sets have been obtained from the VV project where more data can be found. Feel free to use more data and extend the goals proposed in this description.