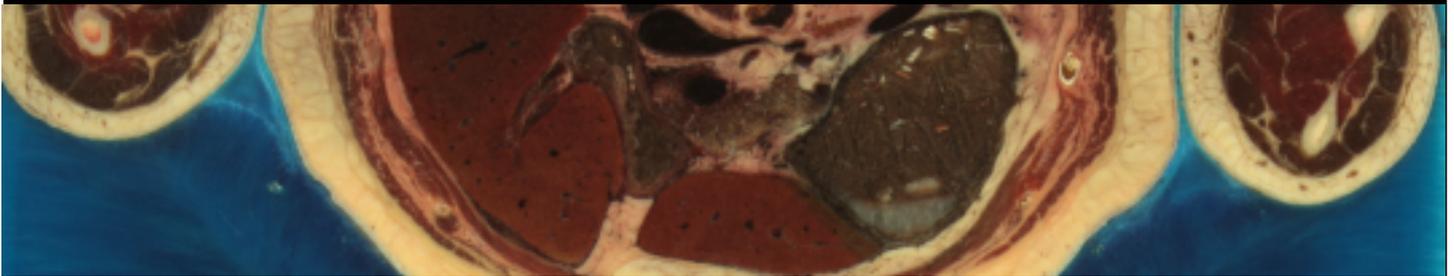


# Thesis Project Registration of visible female frozen CT and full color datasets



University of Zurich<sup>UZH</sup>



## Topic

The Visible Human Project® was carried out by the National Library of Medicine in the USA. The initial aim was to create a digital image dataset of complete human male and female cadavers in magnetic resonance imaging (MRI), computer tomography (CT) and anatomical modes (cryosection images).

The images with the three modalities were acquired with the same characteristics for both the visible man and visible female datasets. First, they scanned the fresh bodies with MR and CT devices. Subsequently, the cadavers were frozen and rescanned in the frozen form with a computer tomograph (MRI is inappropriate for frozen objects since it works on the change of energy within the water molecules). At last, the frozen cadaver was sectioned physically and “photographed”. The later scanned visible female dataset is about 40 Gigabytes in size.

See: [www.nlm.nih.gov/research/visible](http://www.nlm.nih.gov/research/visible)

The interesting aspect about the dataset is that we can study the materials acquired from the three modalities and study their differences and similarities. In case of volume visualization, the information of all data modalities per voxel (3D pixel) can be used in order to enhance the visual result. Therefore, we would like to assemble a multidimensional volumetric dataset, where each voxel knows the RGB information of the physical sections and the greyscale value of the CT dataset. Ideally, we would like to extend the dataset to include the per voxel MRI information. The alignment of the datasets, the so called registration, must be performed to be able to map all modalities to the same voxel positions.

## Assignment

In this student project, you reconstruct the 2D slices of the visible human to a 3D volumetric dataset. For this purpose, you start to reconstruct the CT dataset first and then continue with the anatomical sections.

Once both datasets are reconstructed, the

task is to align/register the datasets such that the voxel grid of the two datasets is aligned (image registration).

## Requirements

Interest in image processing and cross-platform application development in C++.

## Work Load

- 20% theory
- 60% implementation
- 20% testing

## Project Type

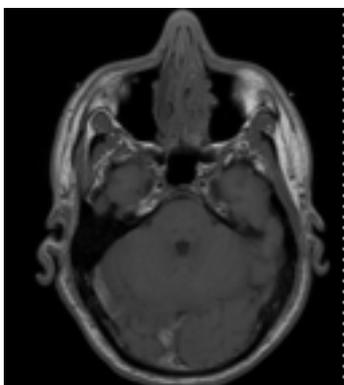
Based on the scope of the topic and optional tasks, this project can be done as Bachelor or Master thesis. Goals are adjusted depending on the project type.

## Supervision

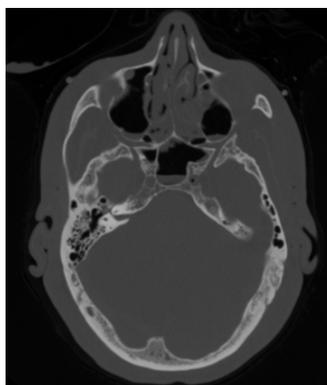
Prof. Dr. Renato Pajarola  
Susanne Suter (Assistant)

## Contact

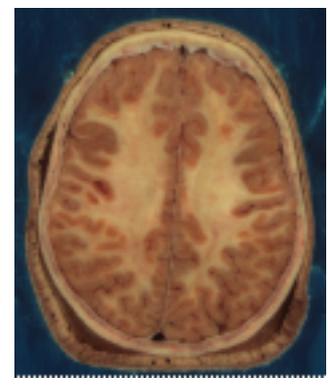
Write an E-Mail to [susuter@ifi.uzh.ch](mailto:susuter@ifi.uzh.ch)



Fresh MRI image of the visible human head



Frozen CT image of the visible human head



Frozen cryosectional image of the visible human head